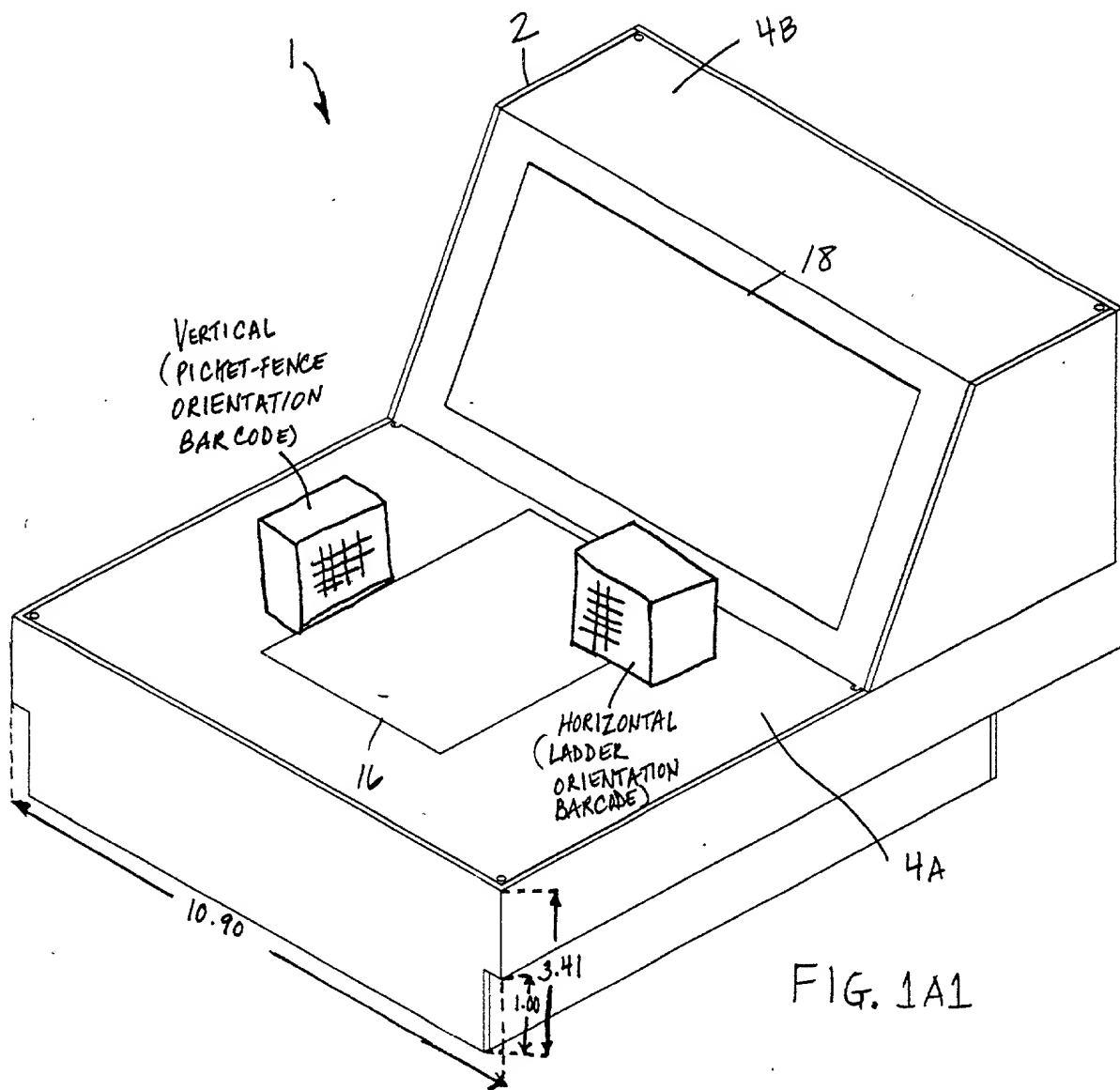


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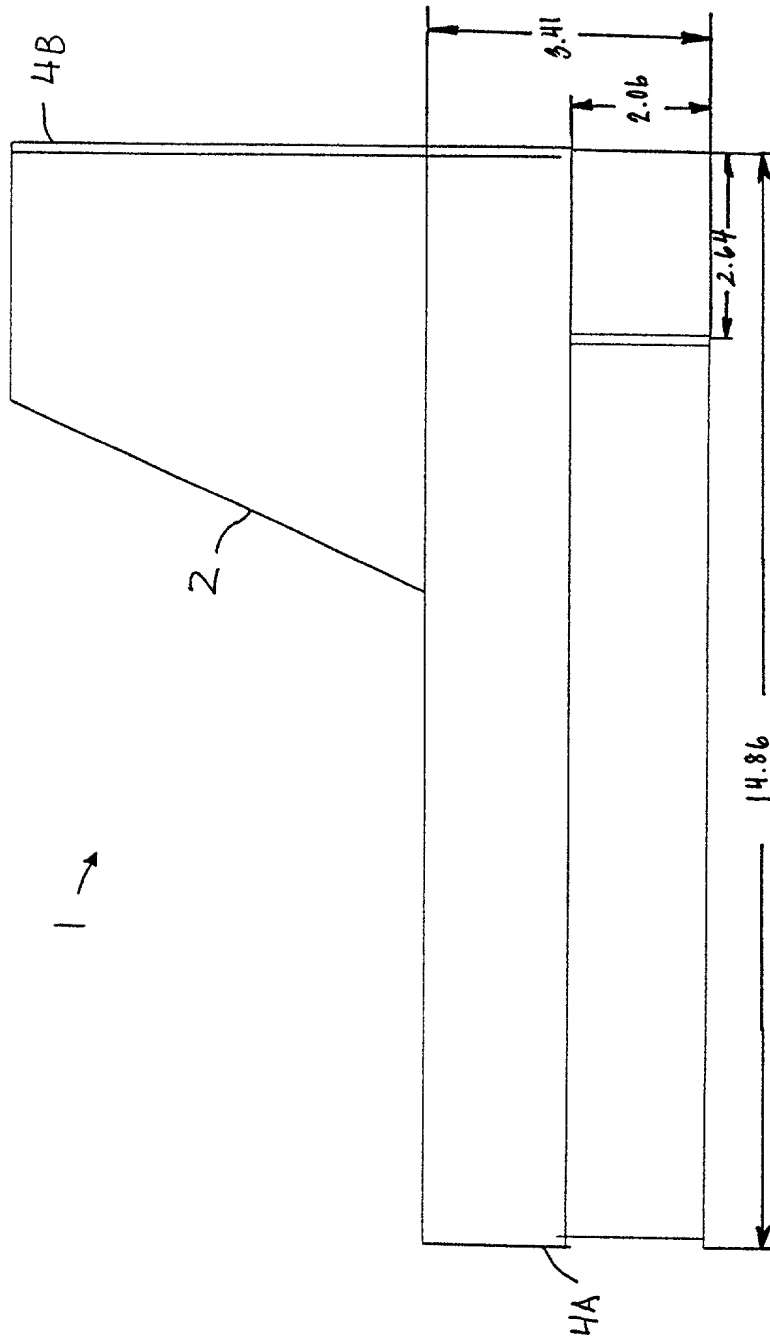


FIG. 1A2

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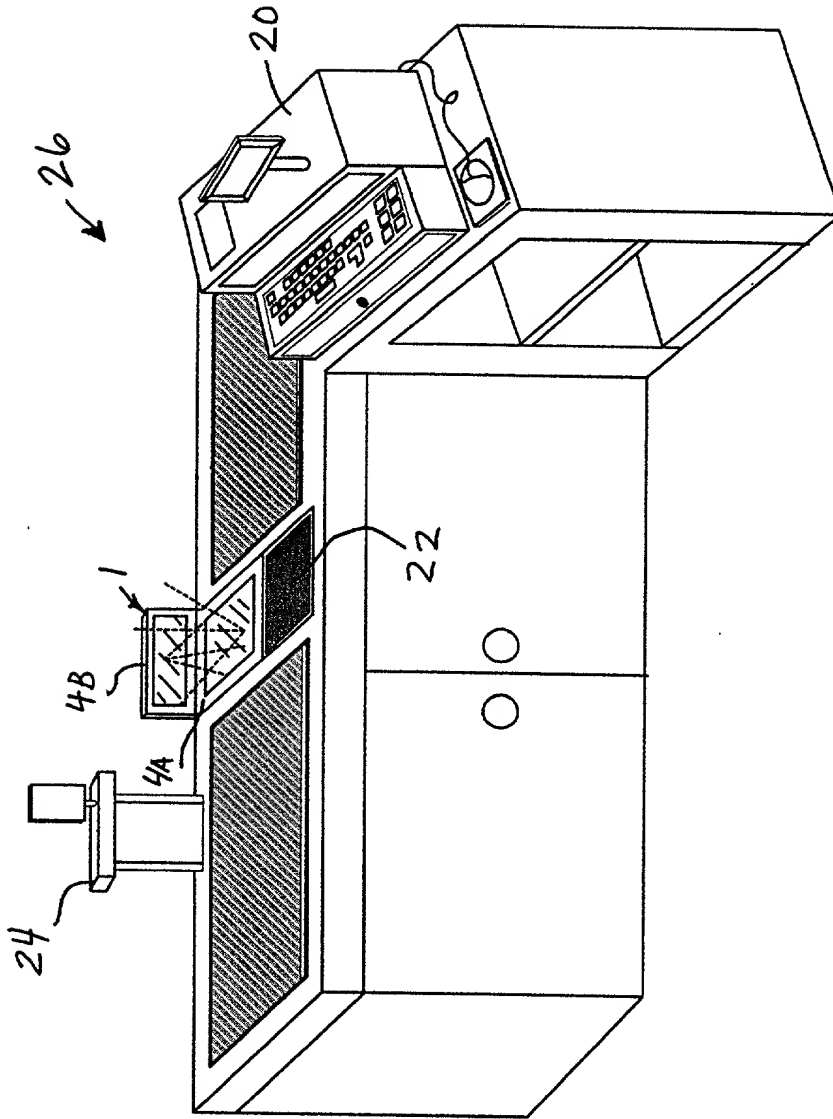


FIG. 1B

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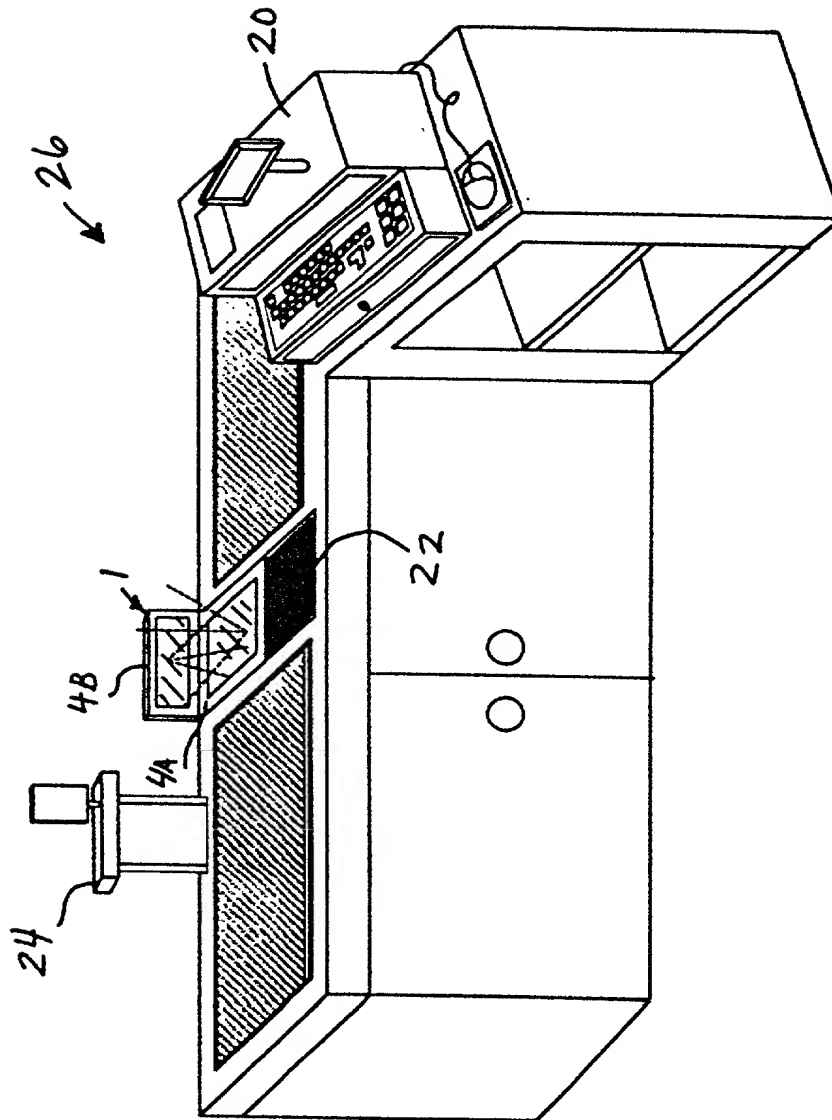


FIG. 1B1

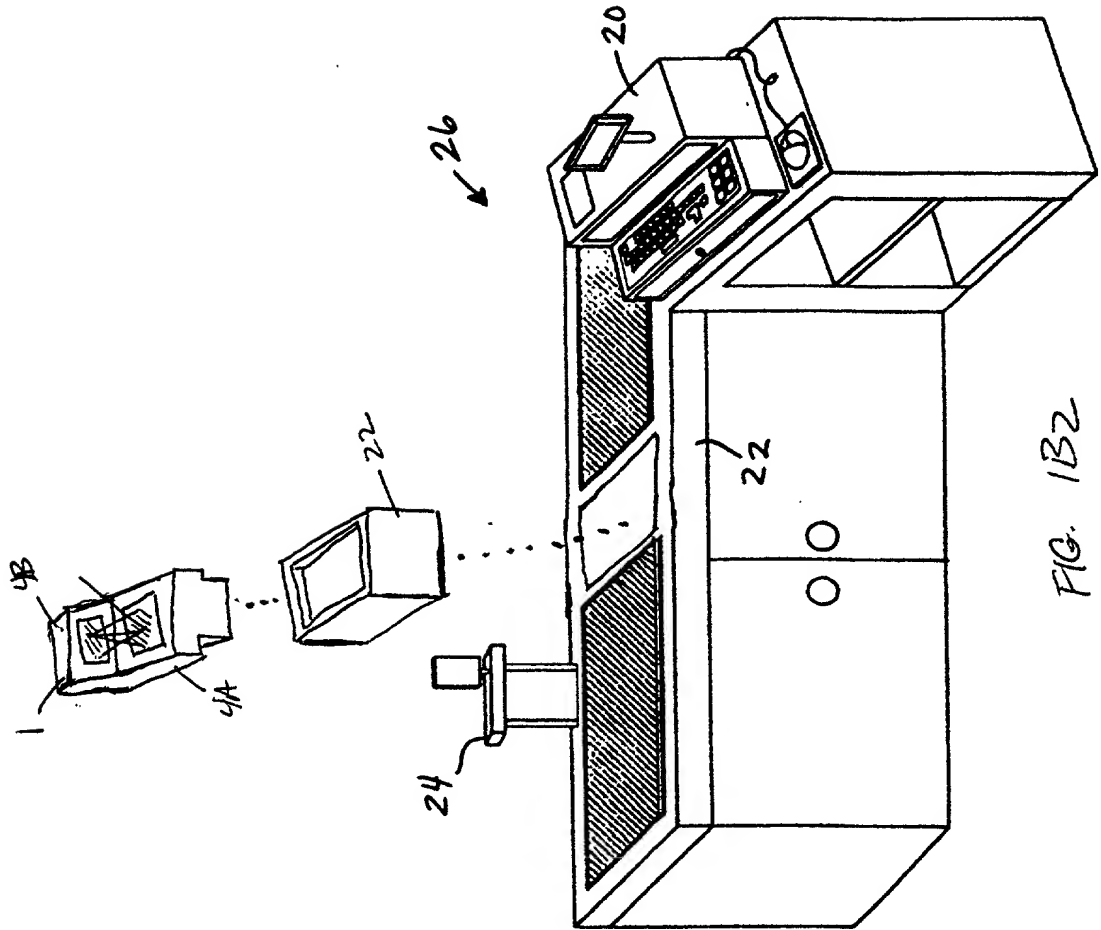


FIG. 1B2

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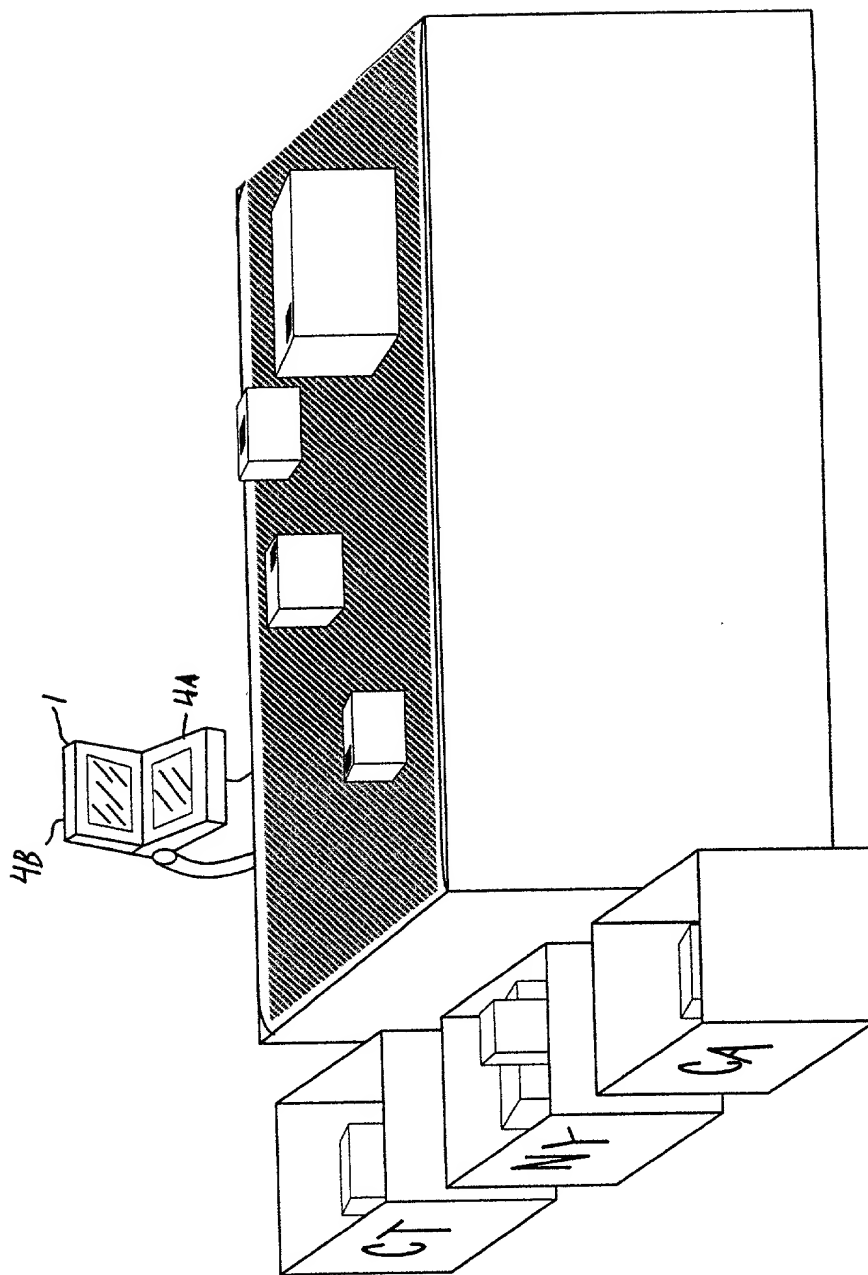


FIG. 1C

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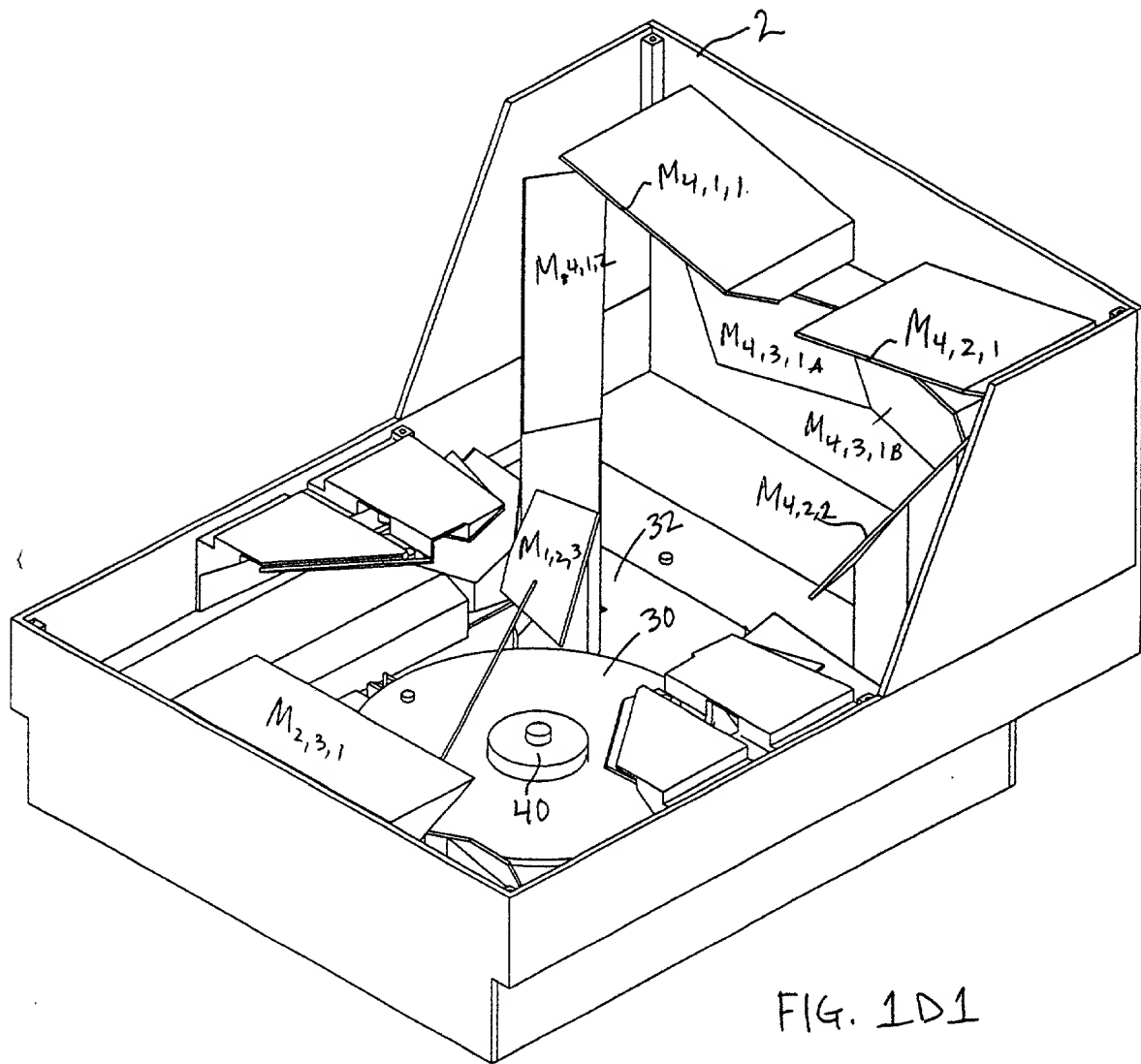


FIG. 1D1

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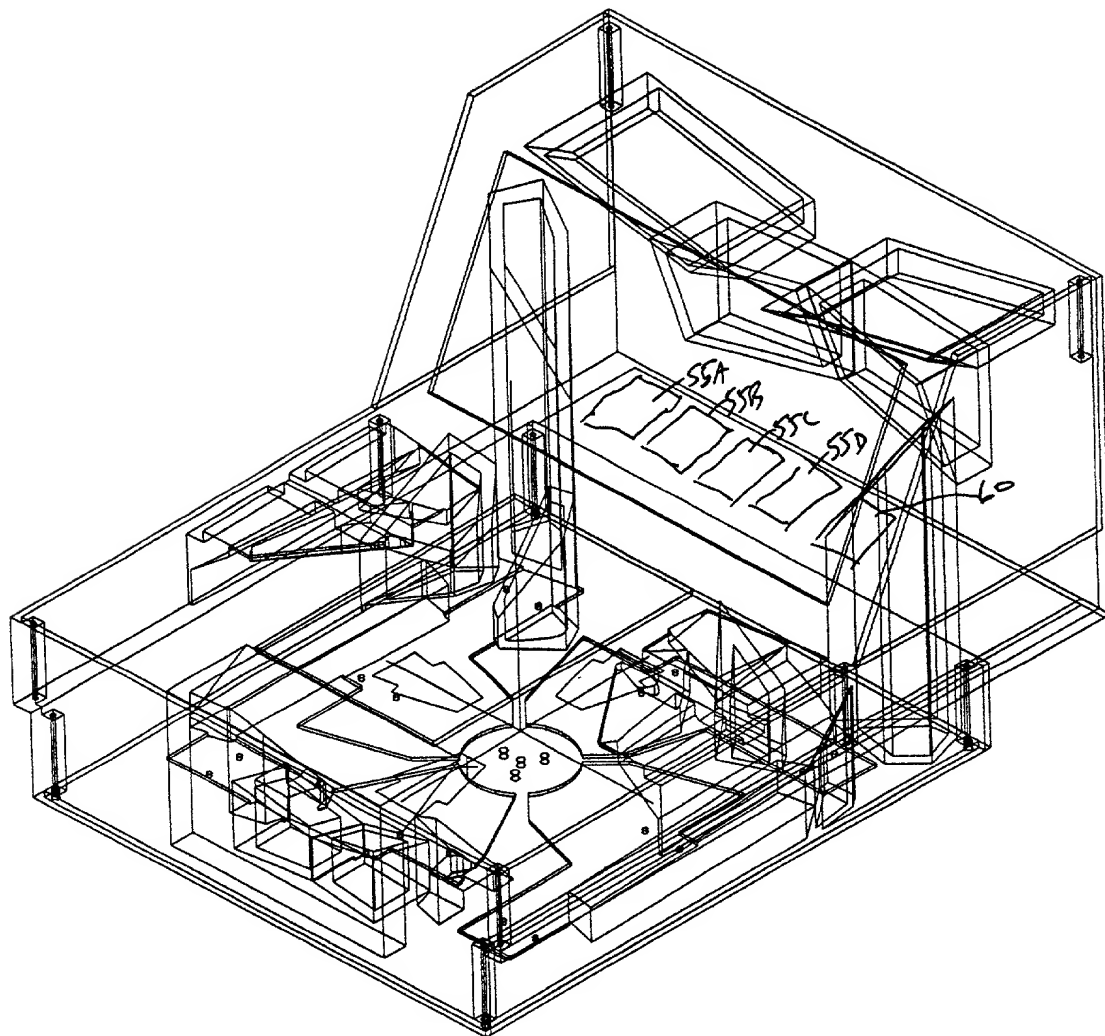
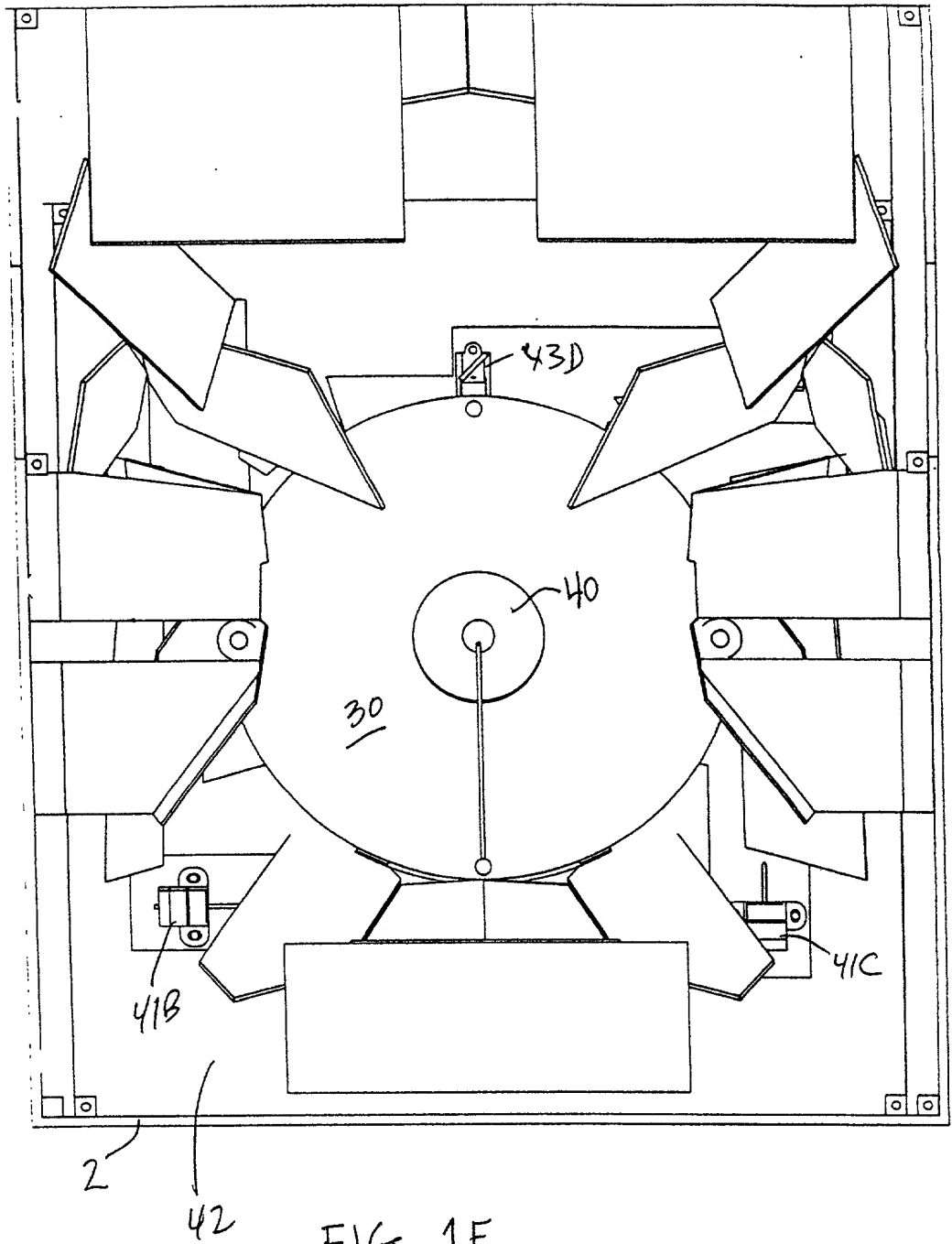


FIG. 1D2

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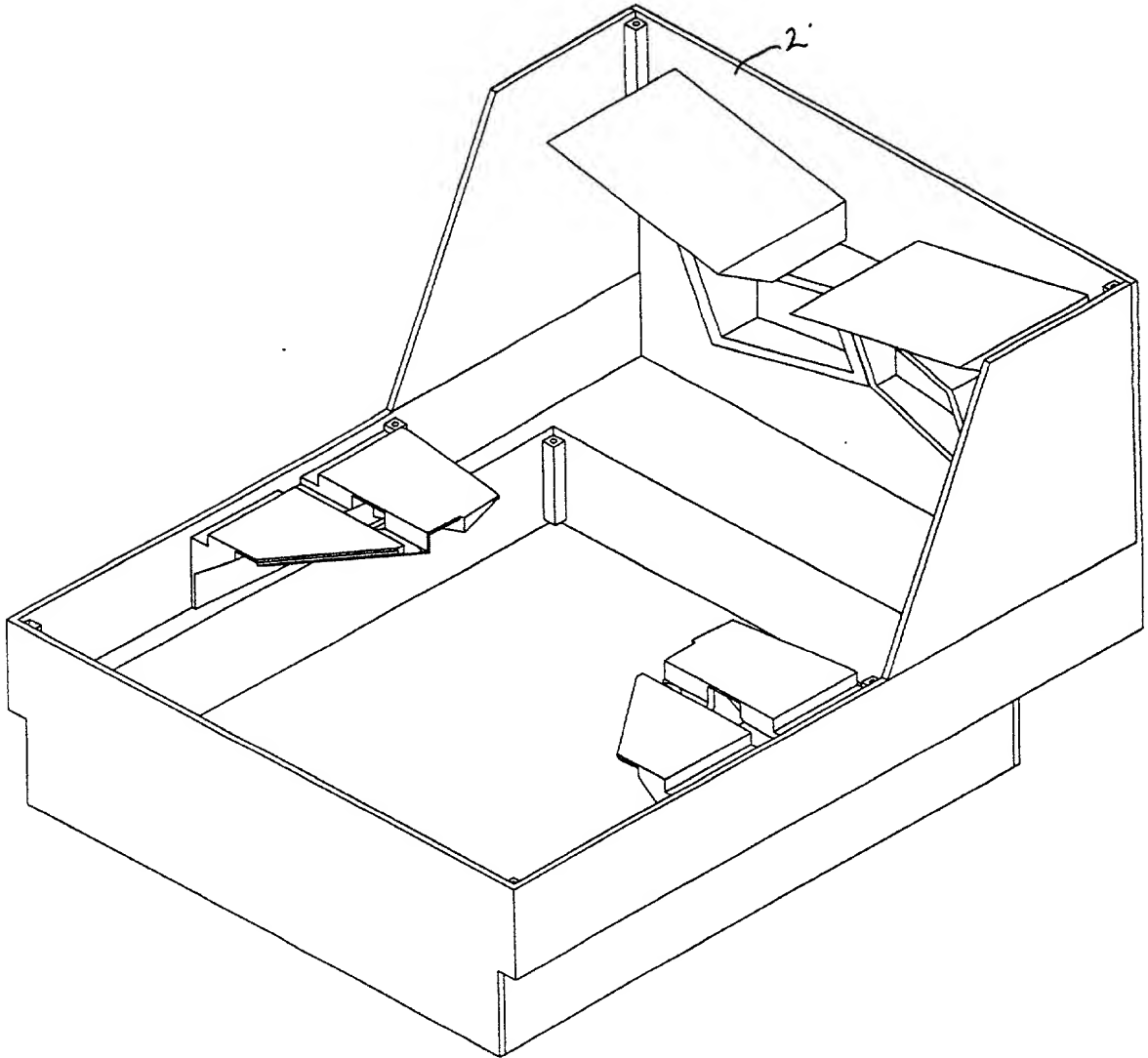


FIG. 1F

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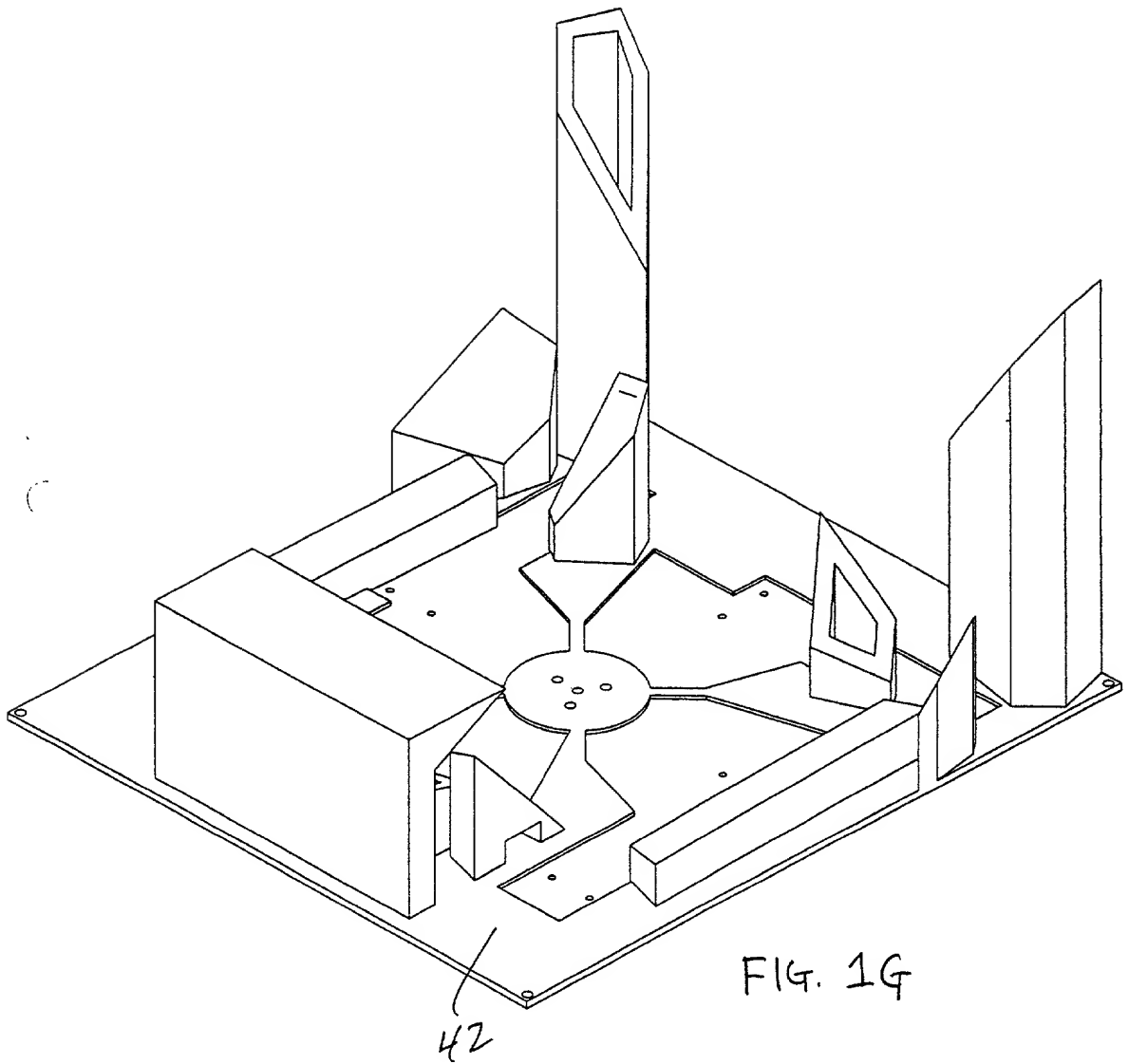


FIG. 1G

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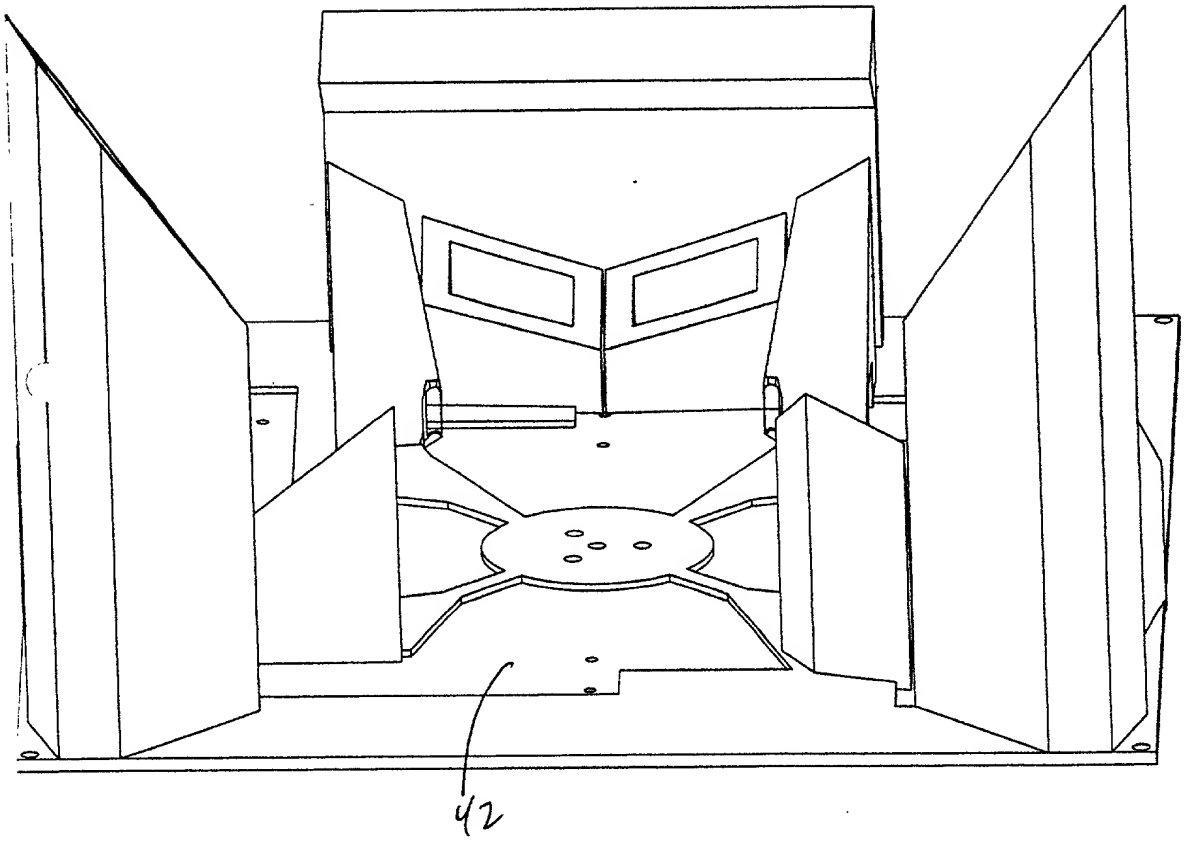


FIG. 1H

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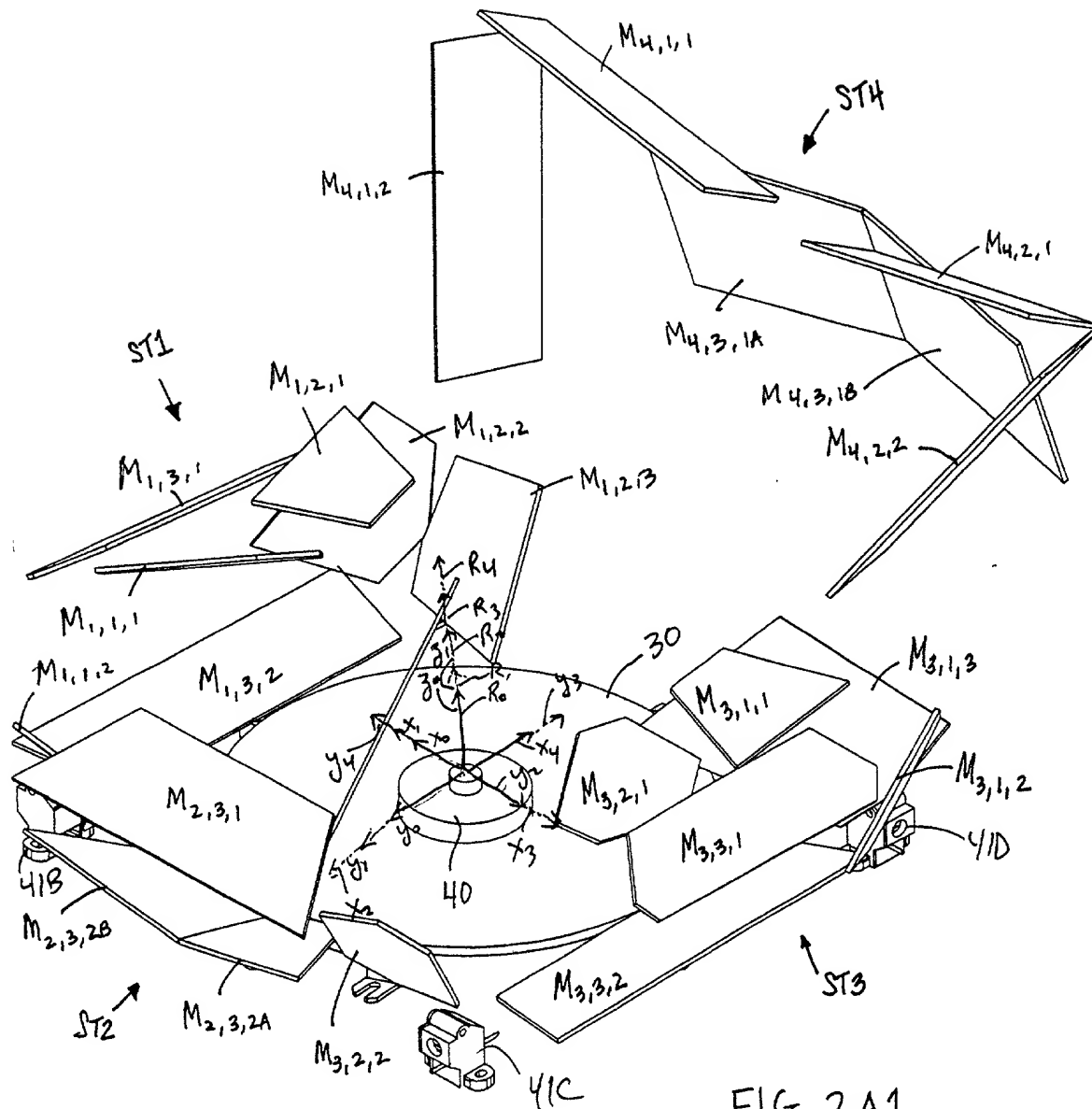
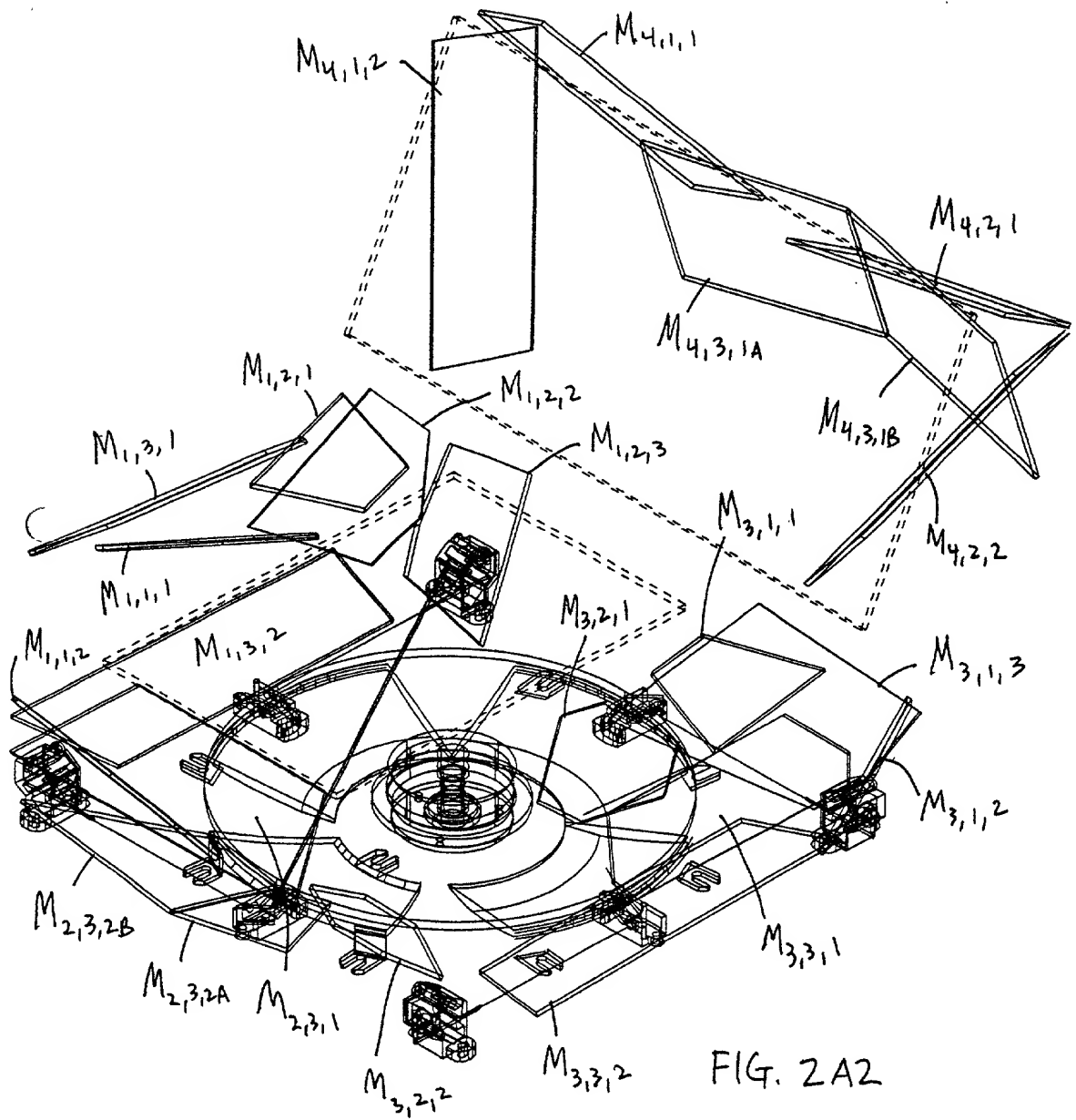


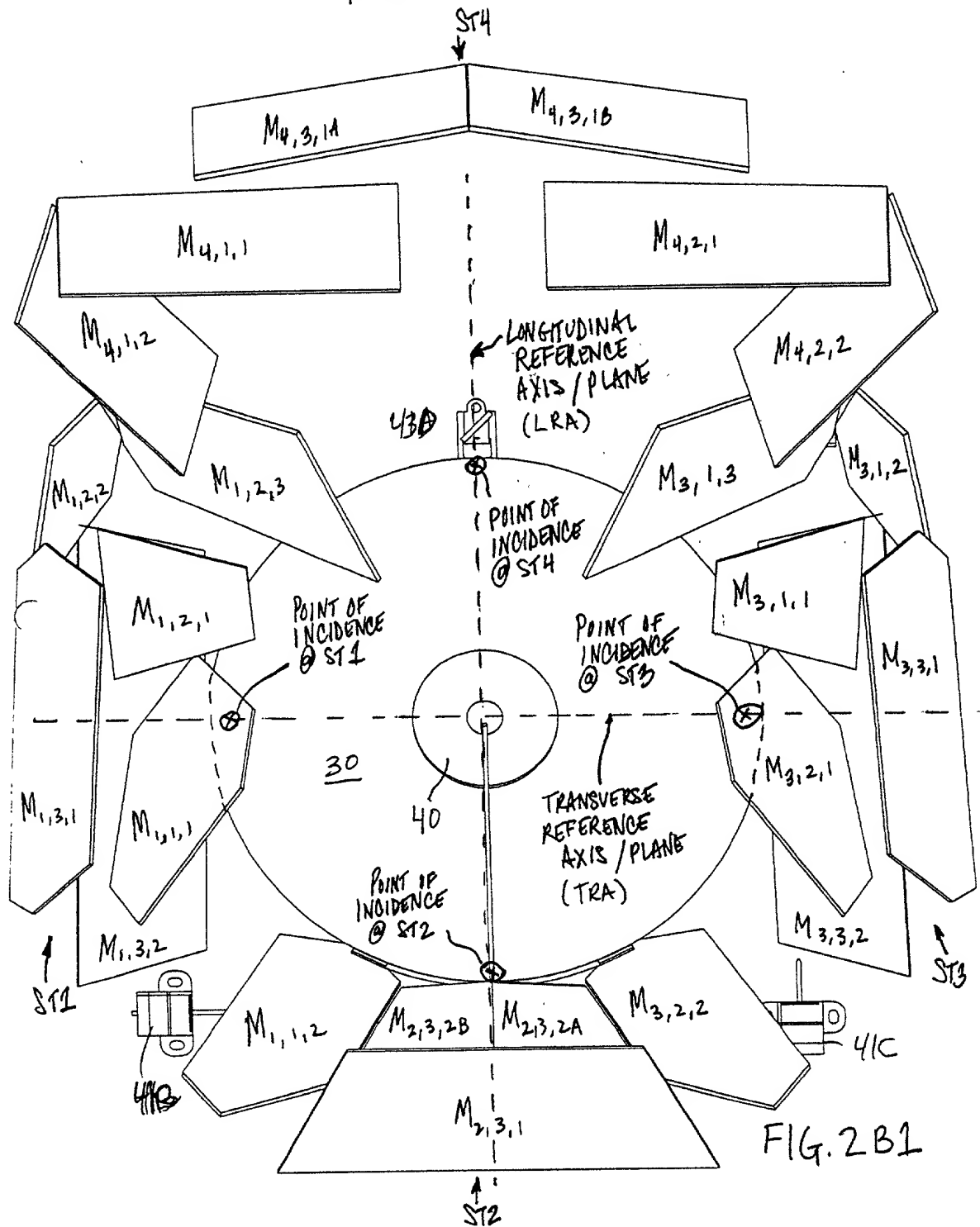
FIG. 2A1

Define: R_1, R_2, R_3, R_4, R_0

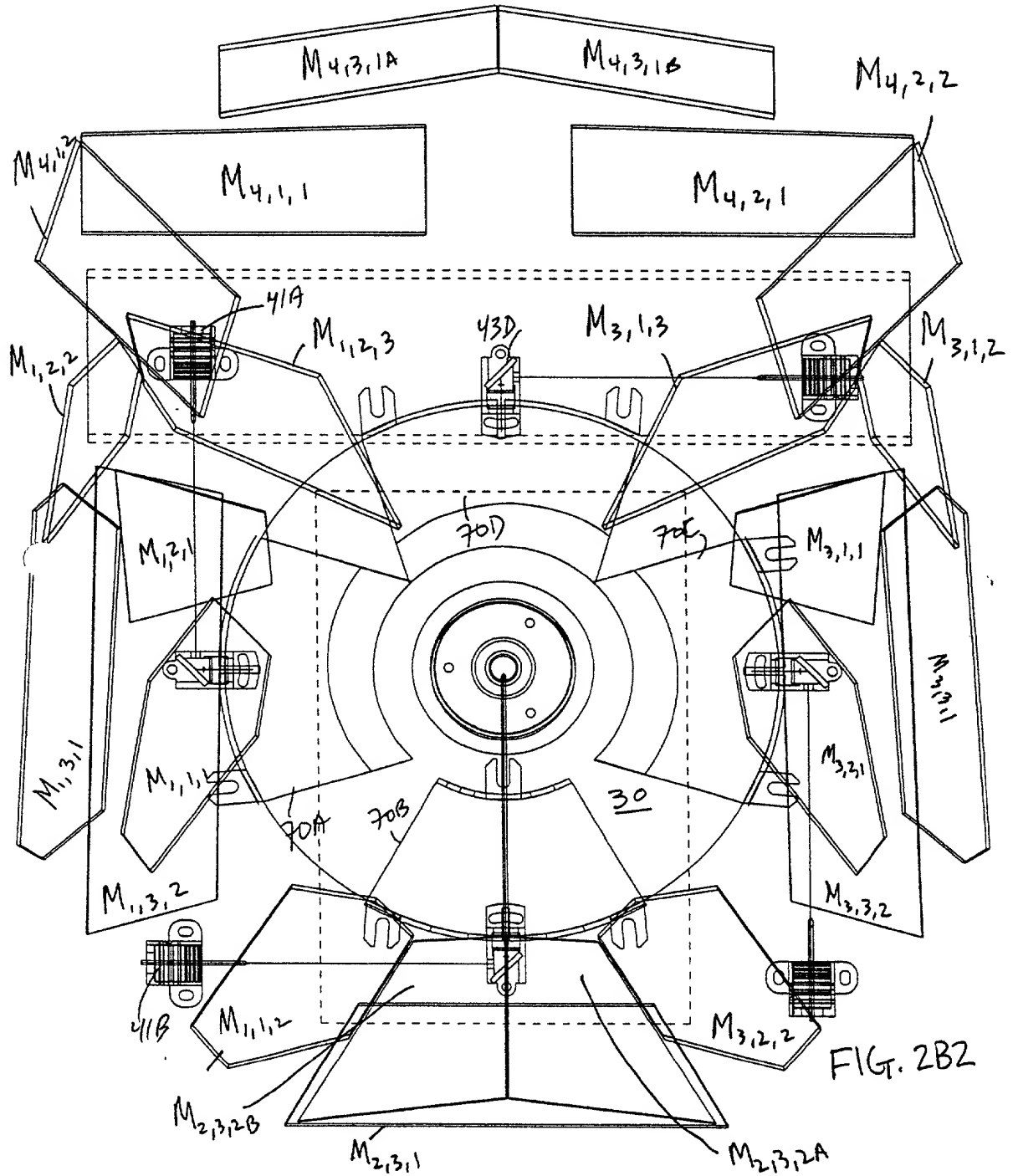
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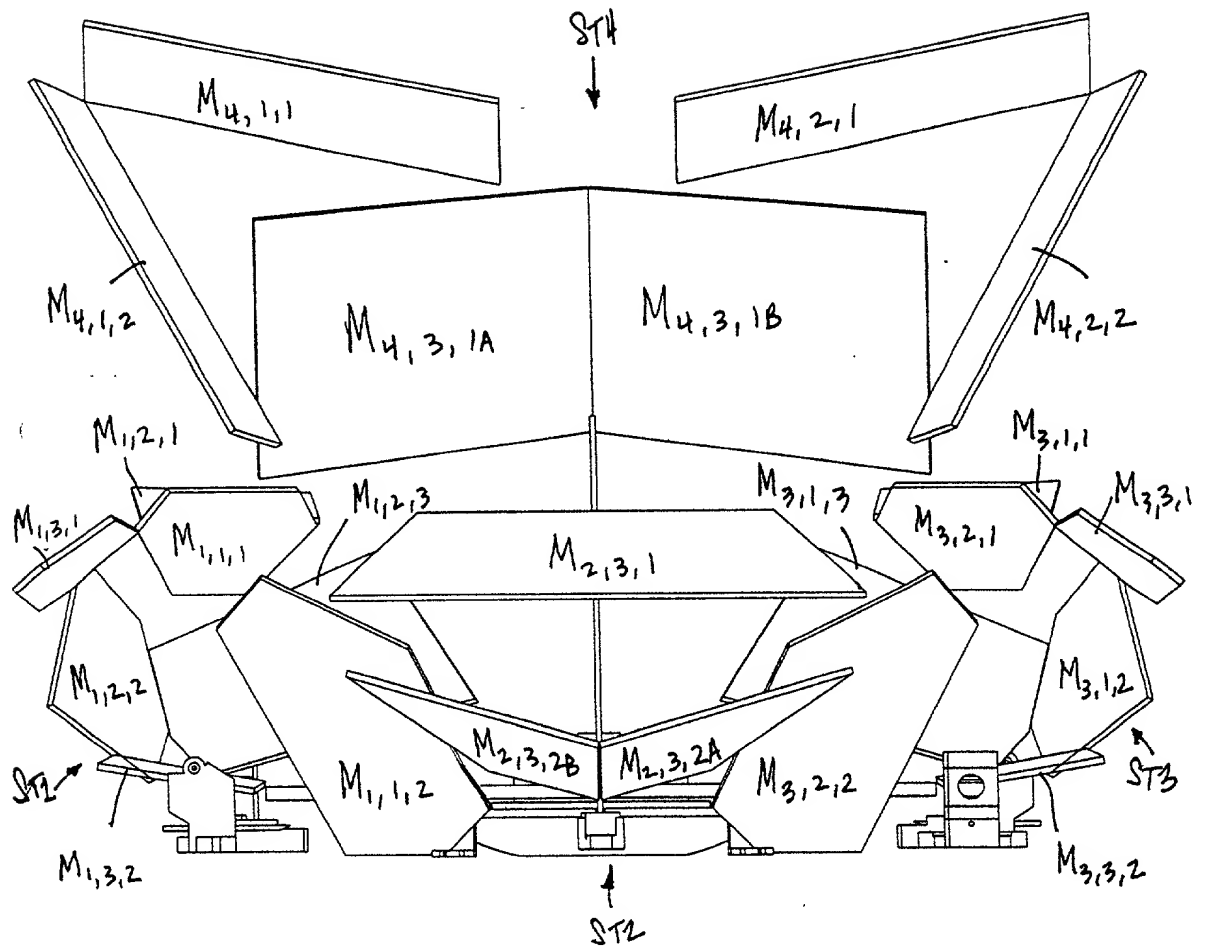


FIG. 2C1

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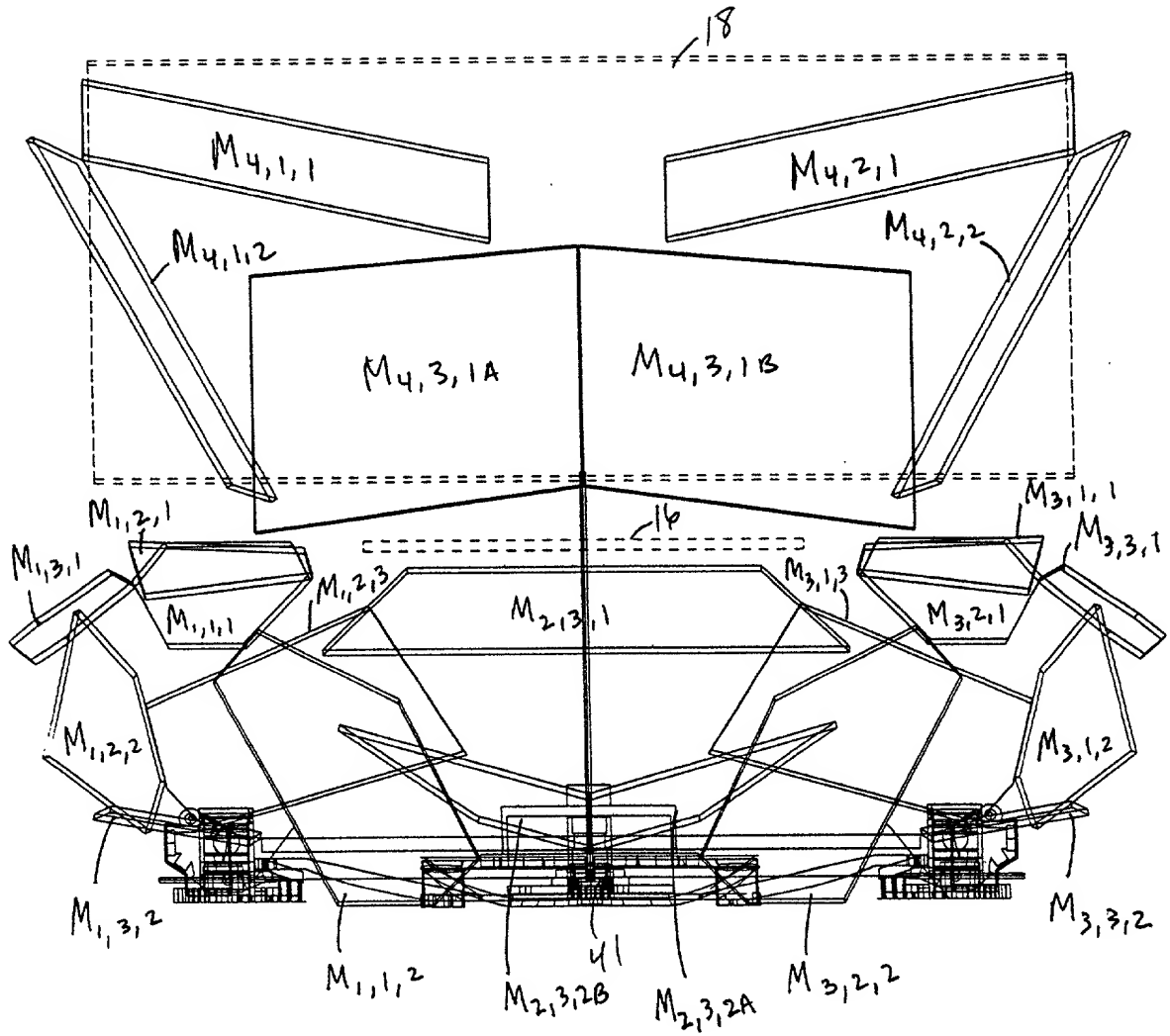


FIG. 2C2

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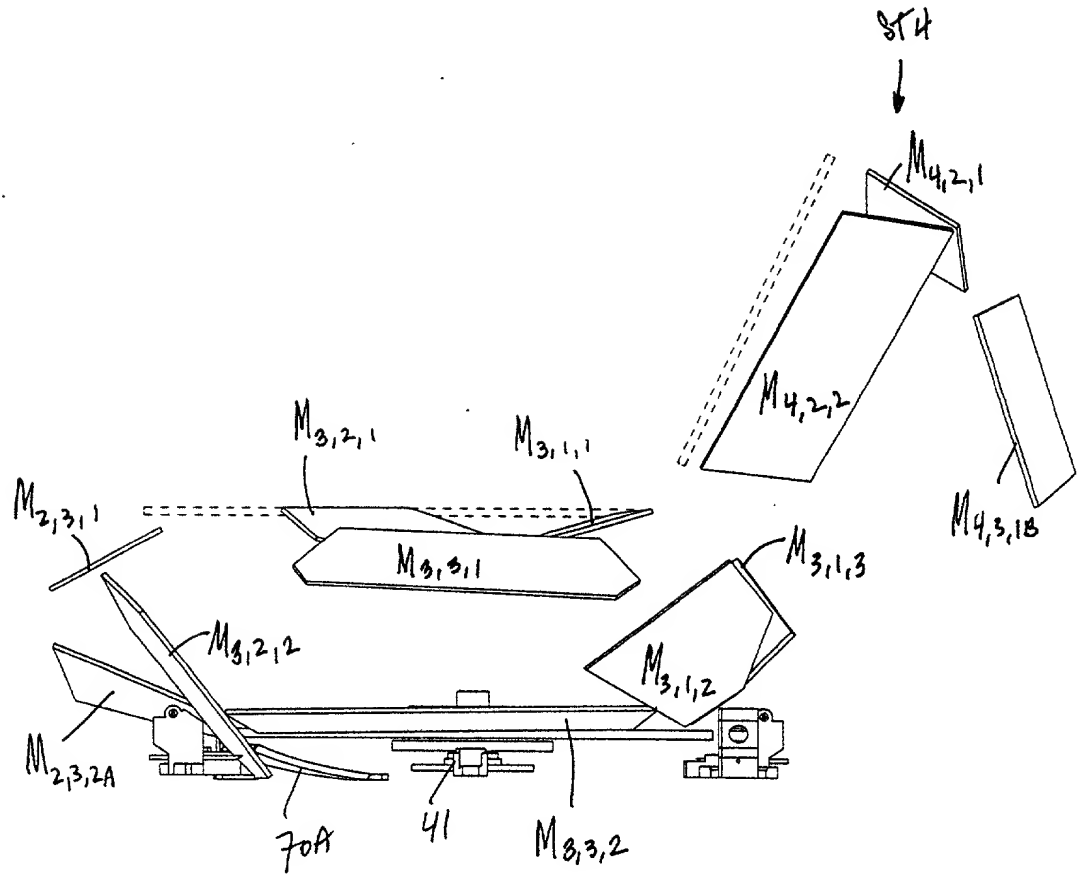


FIG. 2D1

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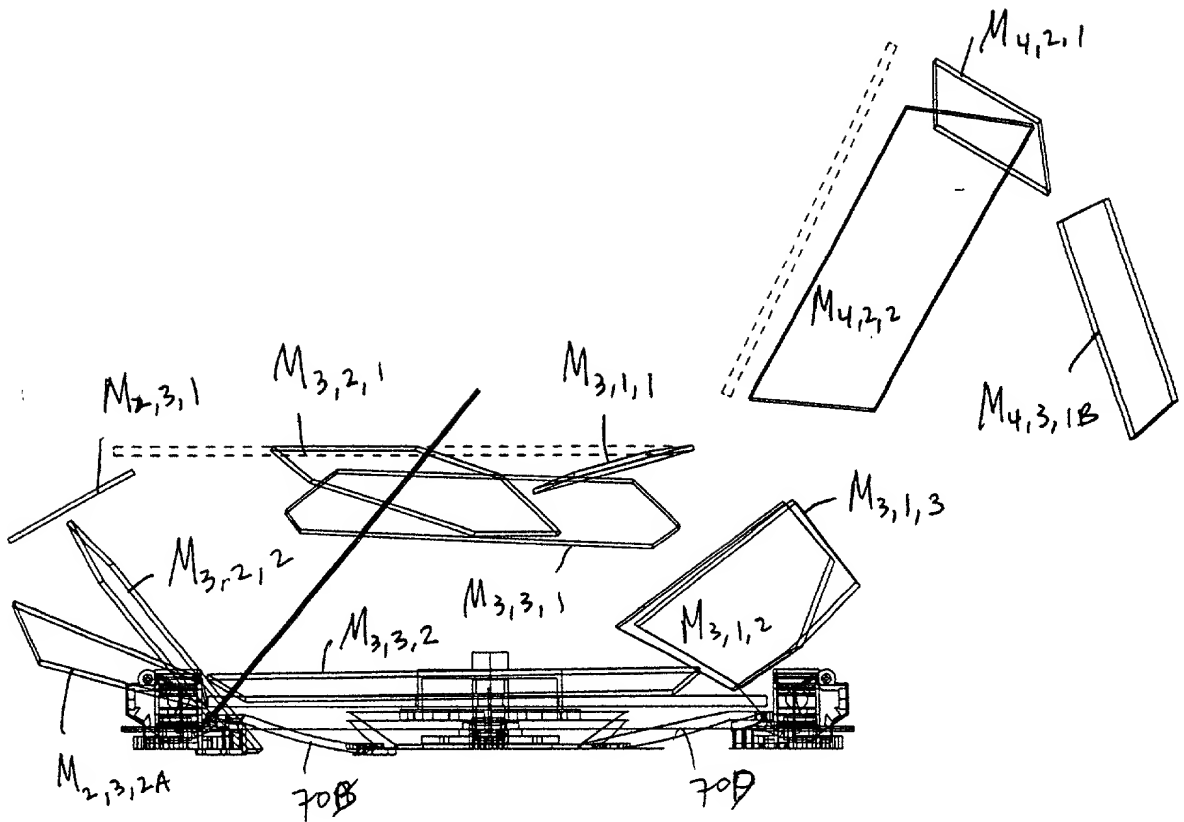


FIG. 202

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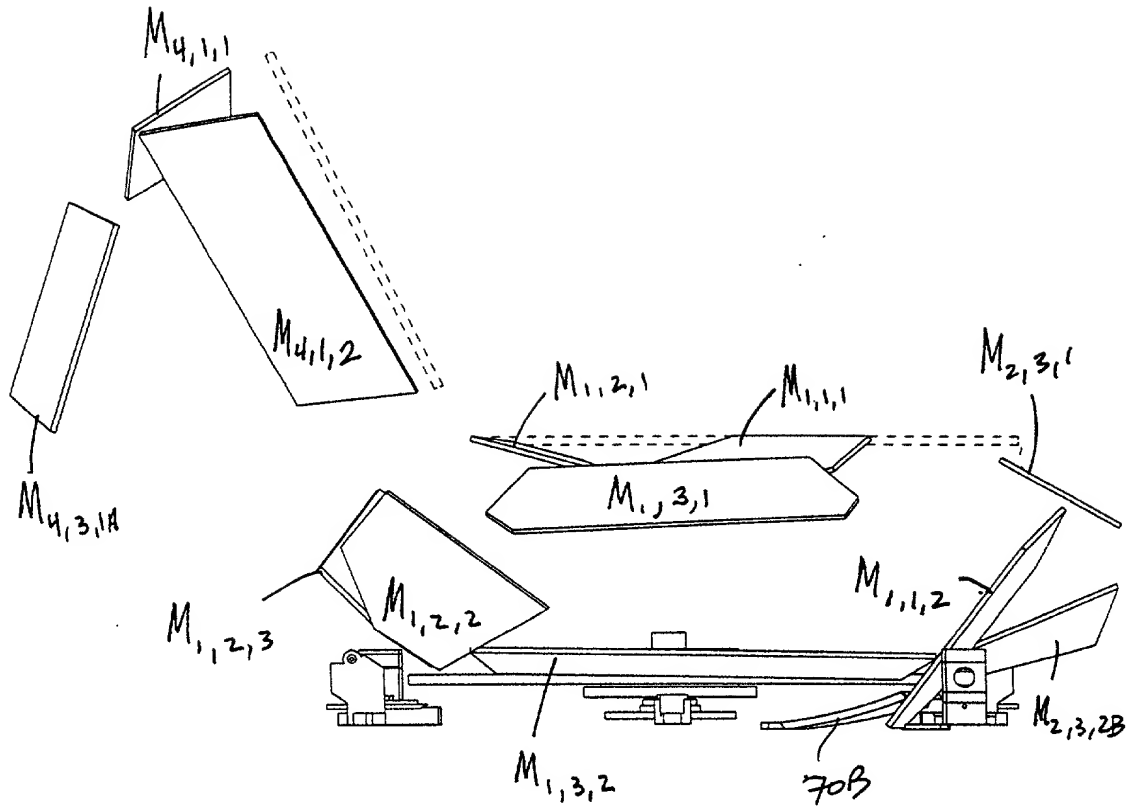


FIG. 2E1

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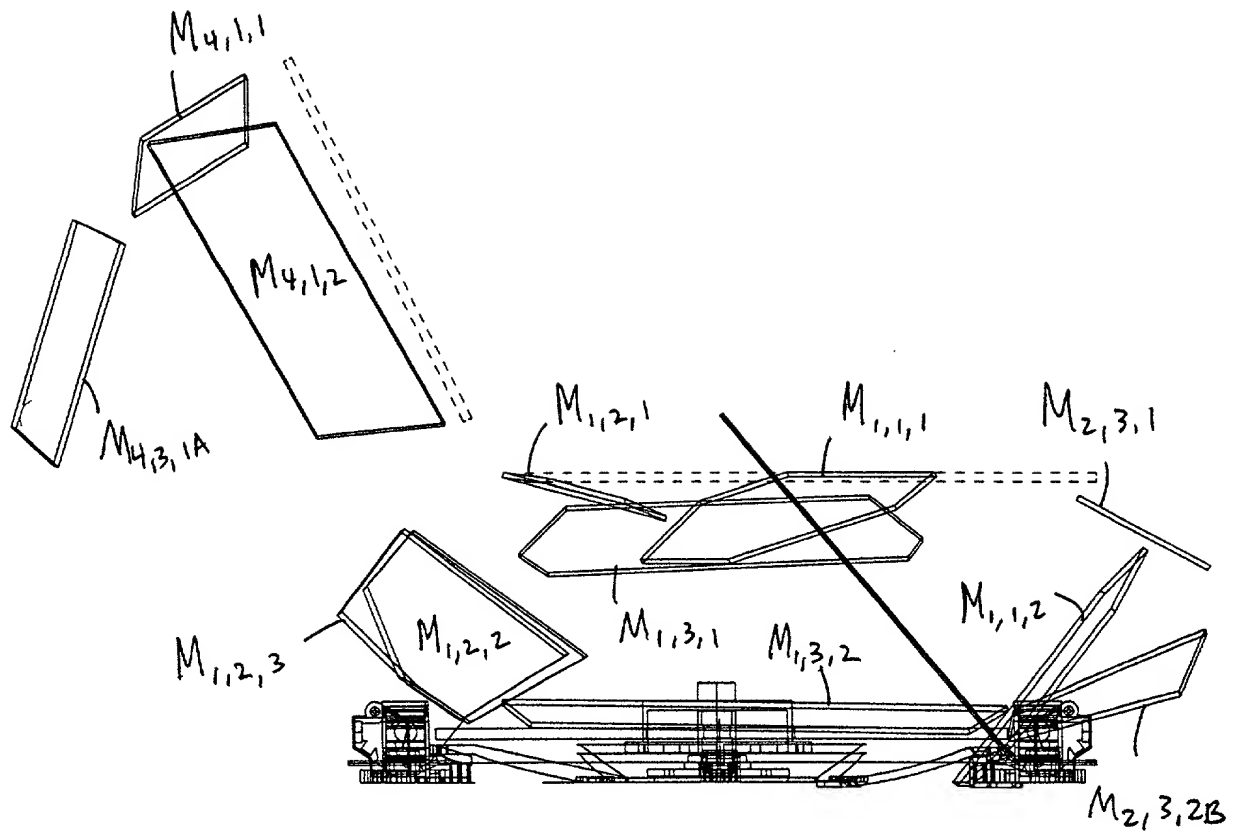


FIG. 2E2

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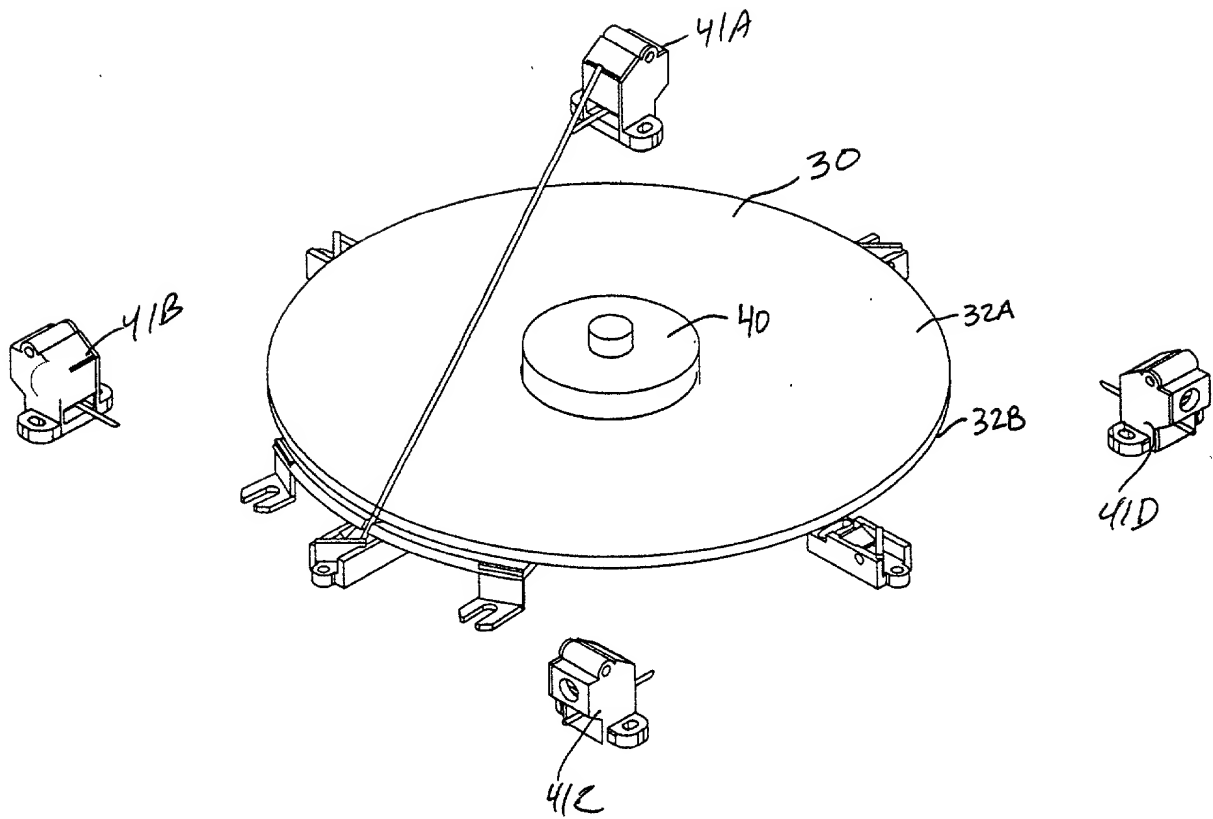


FIG. 2F1

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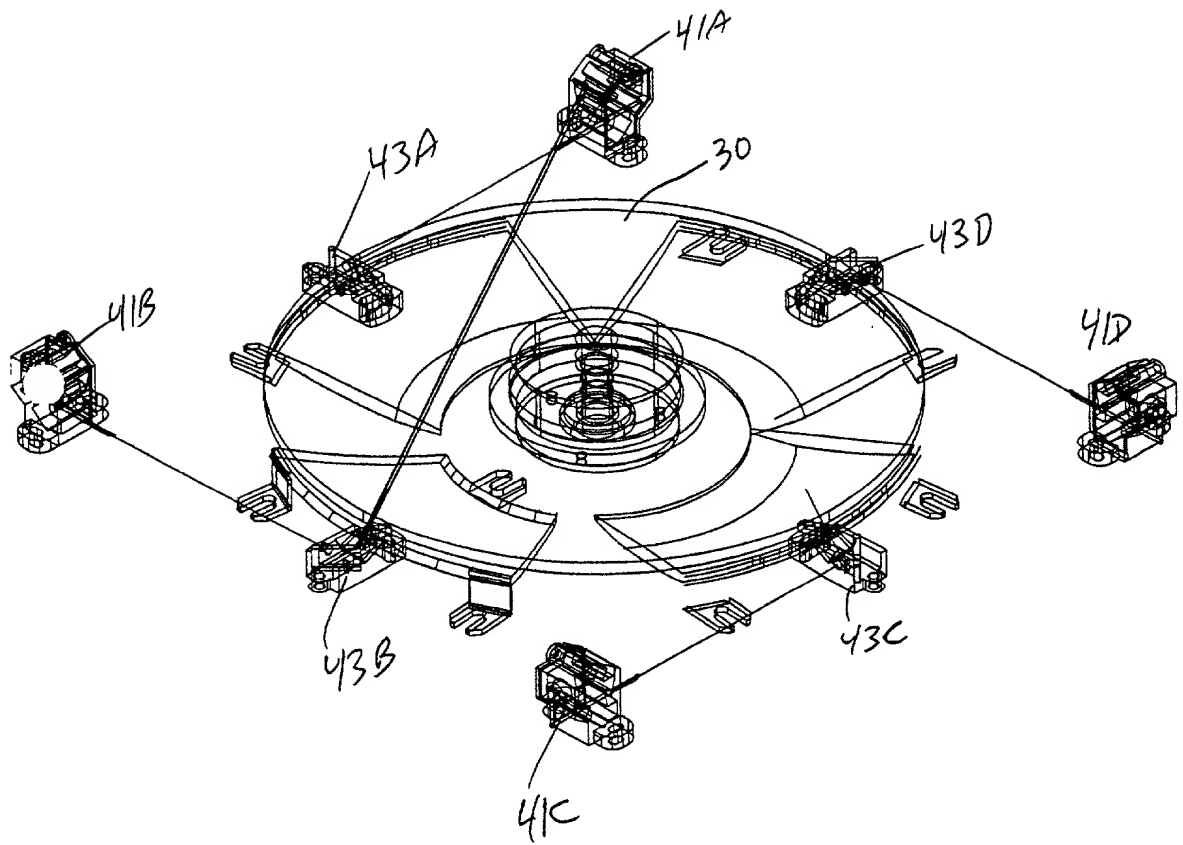


FIG. 2F2

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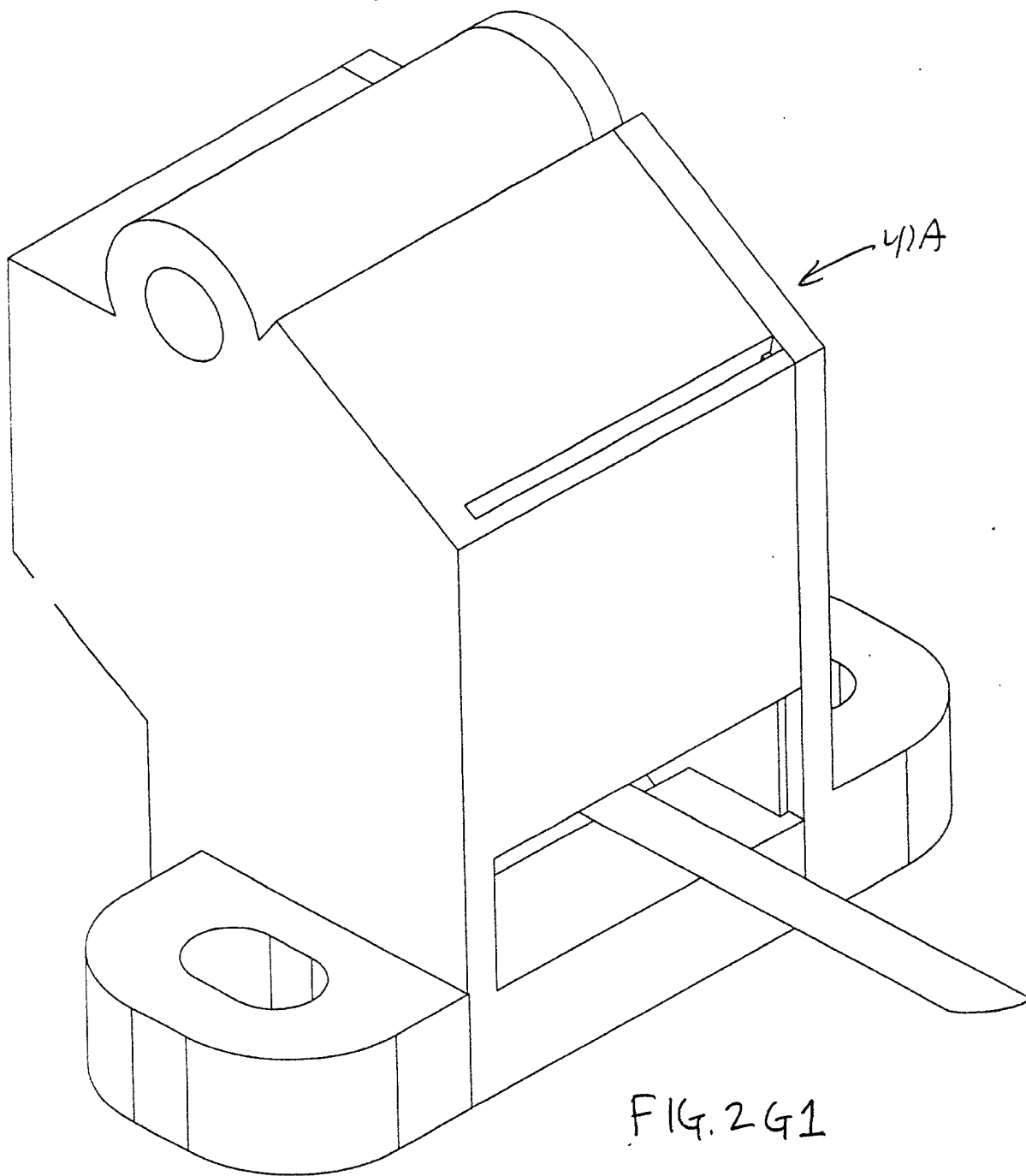


FIG. 261

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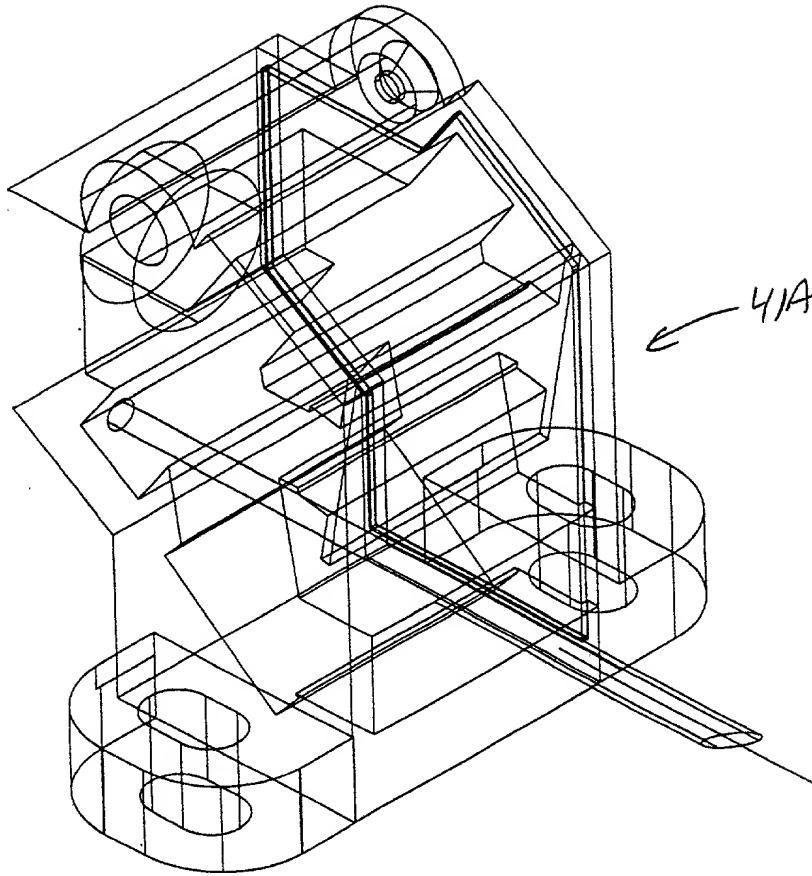


FIG. 2G2

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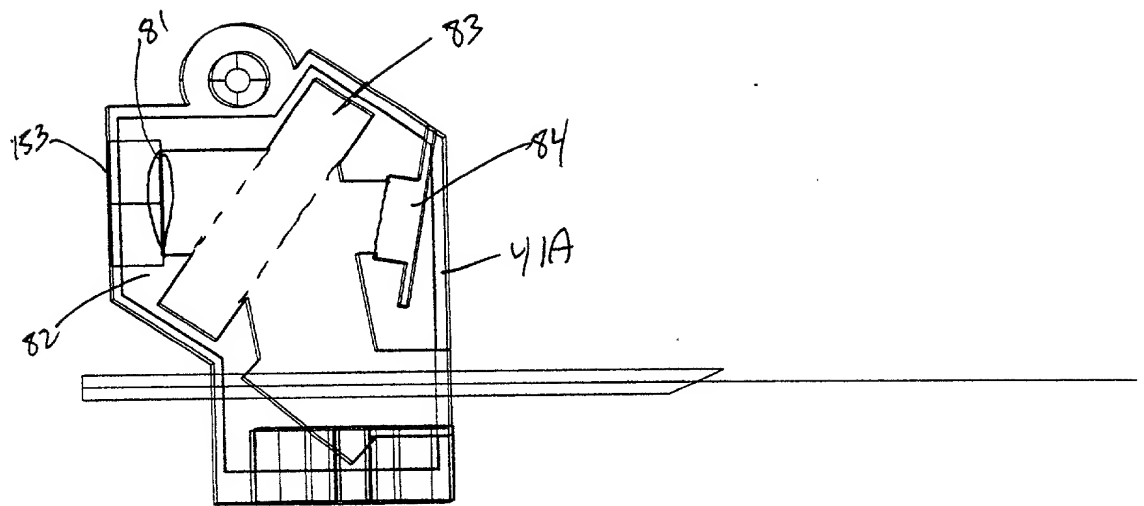


FIG. 2G3

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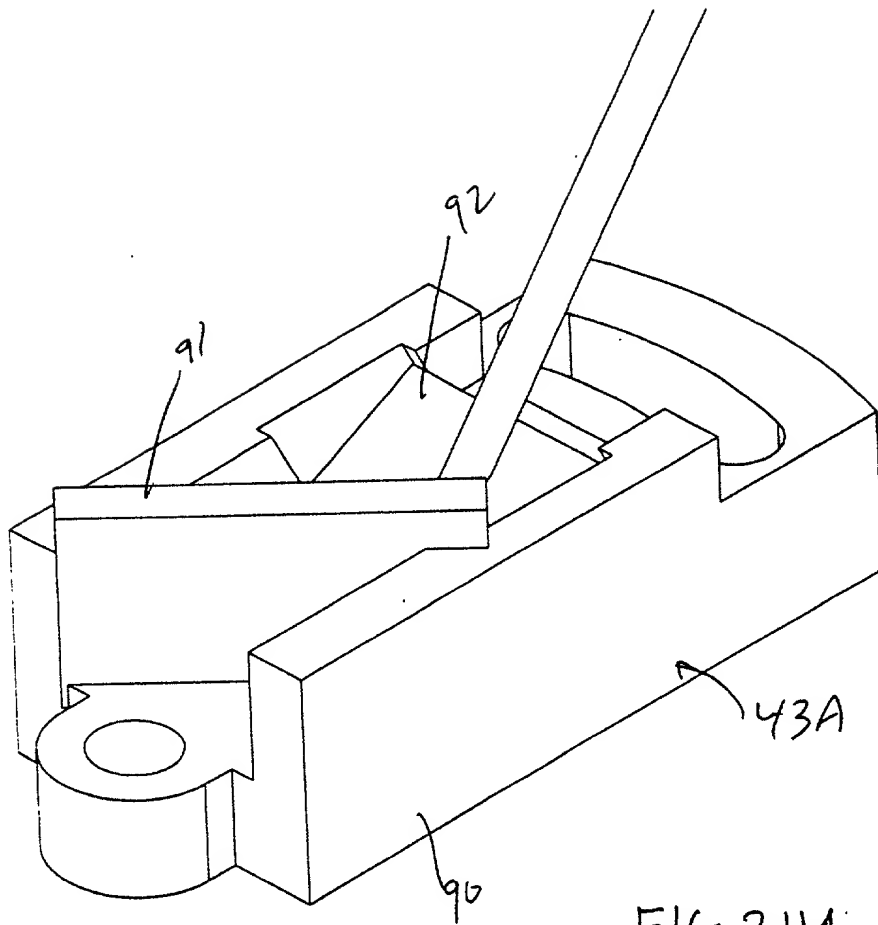


FIG. 2H1

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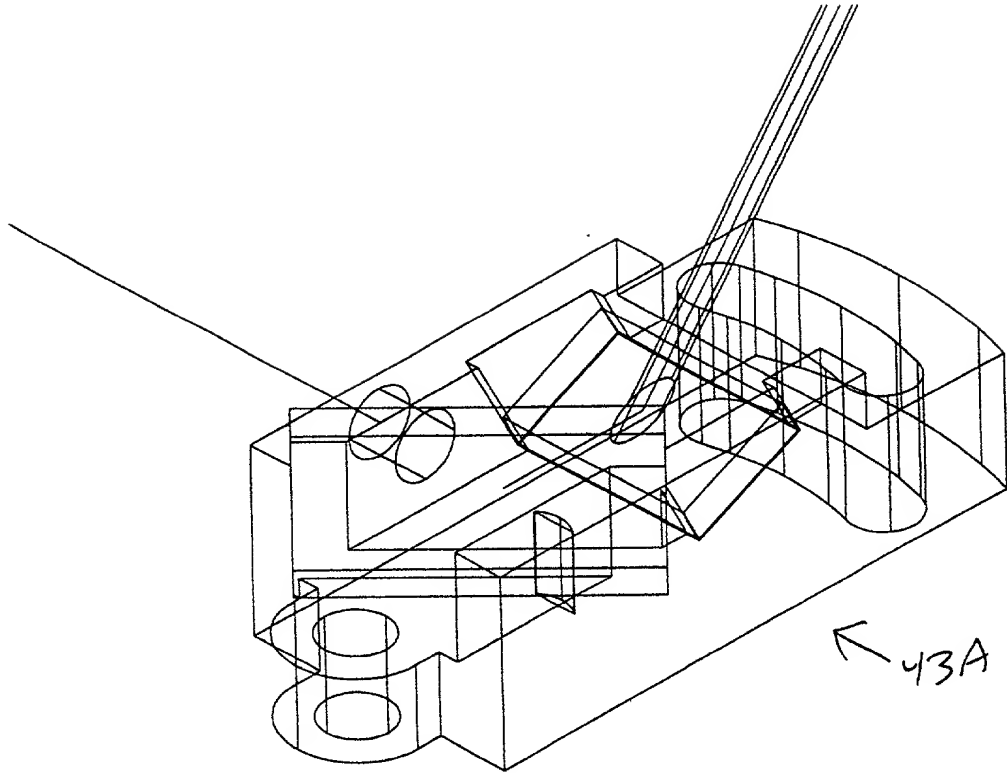


FIG. 2H2

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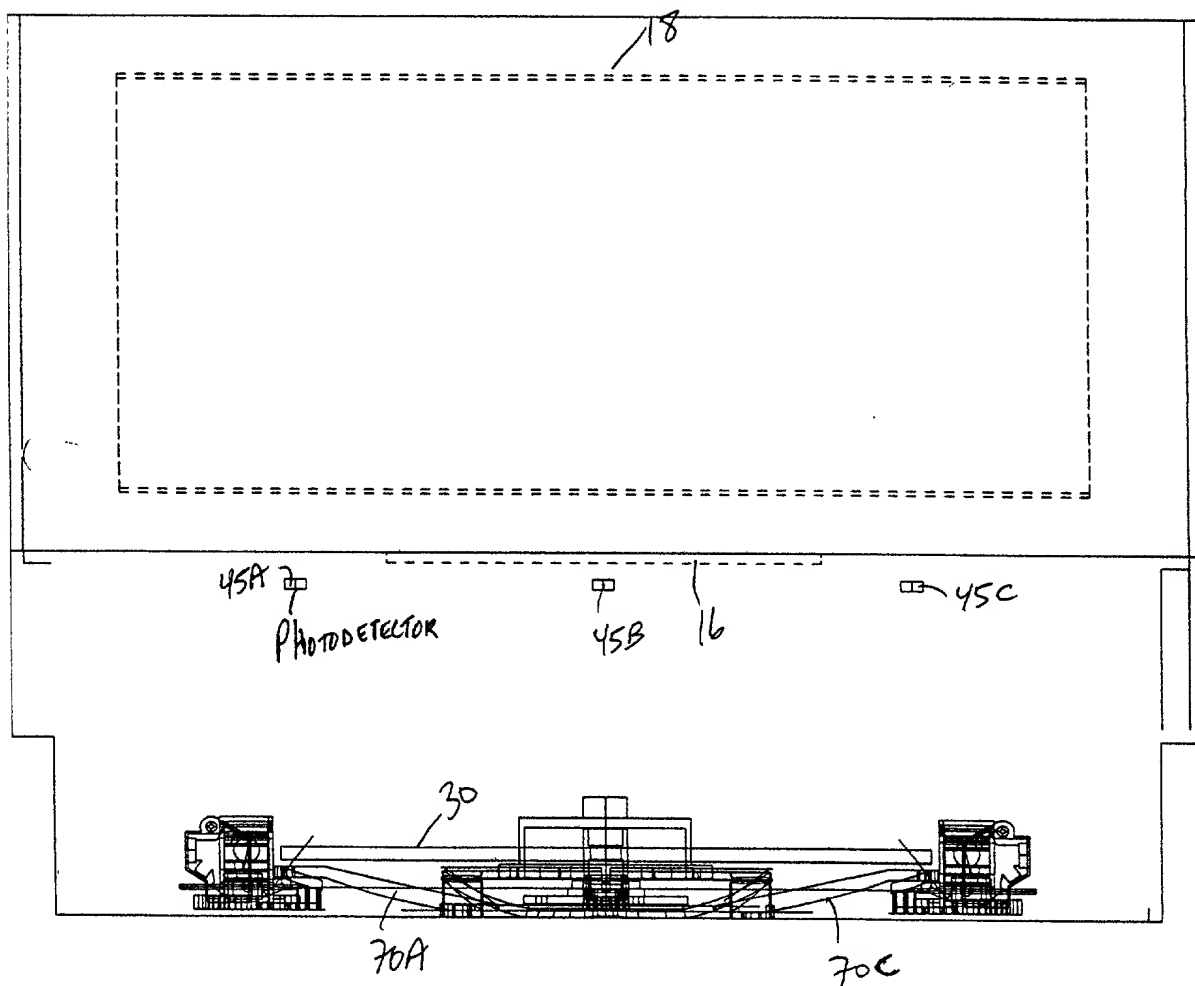


FIG. 2I1

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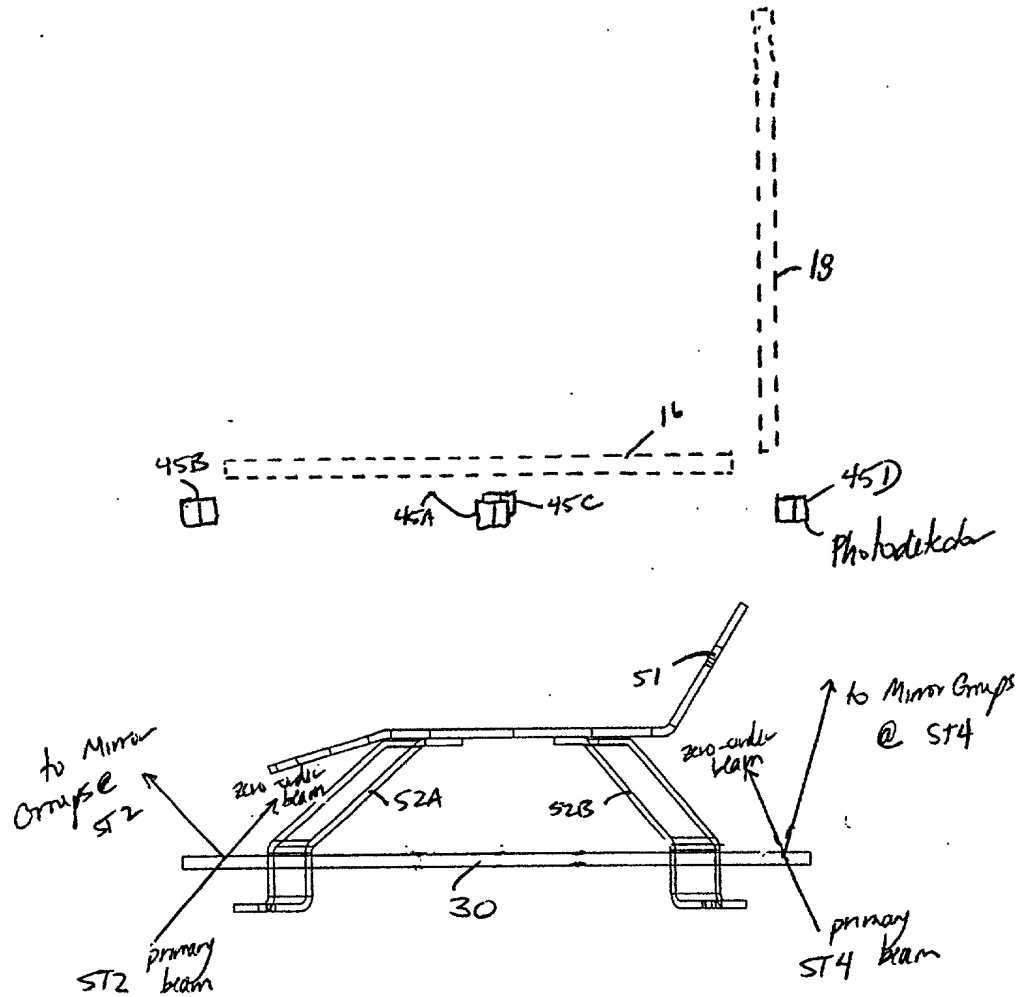


FIG. 2I2

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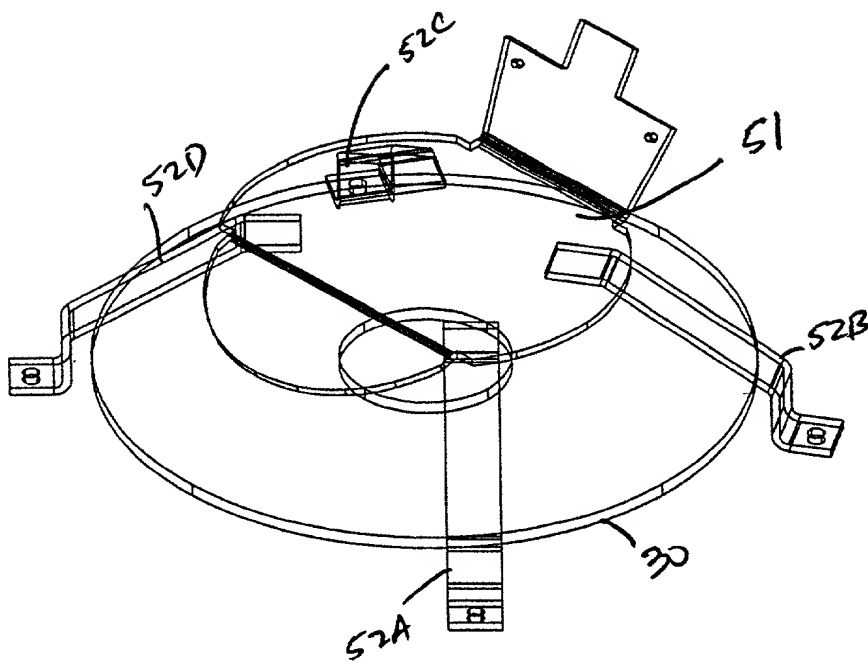


FIG 2I3

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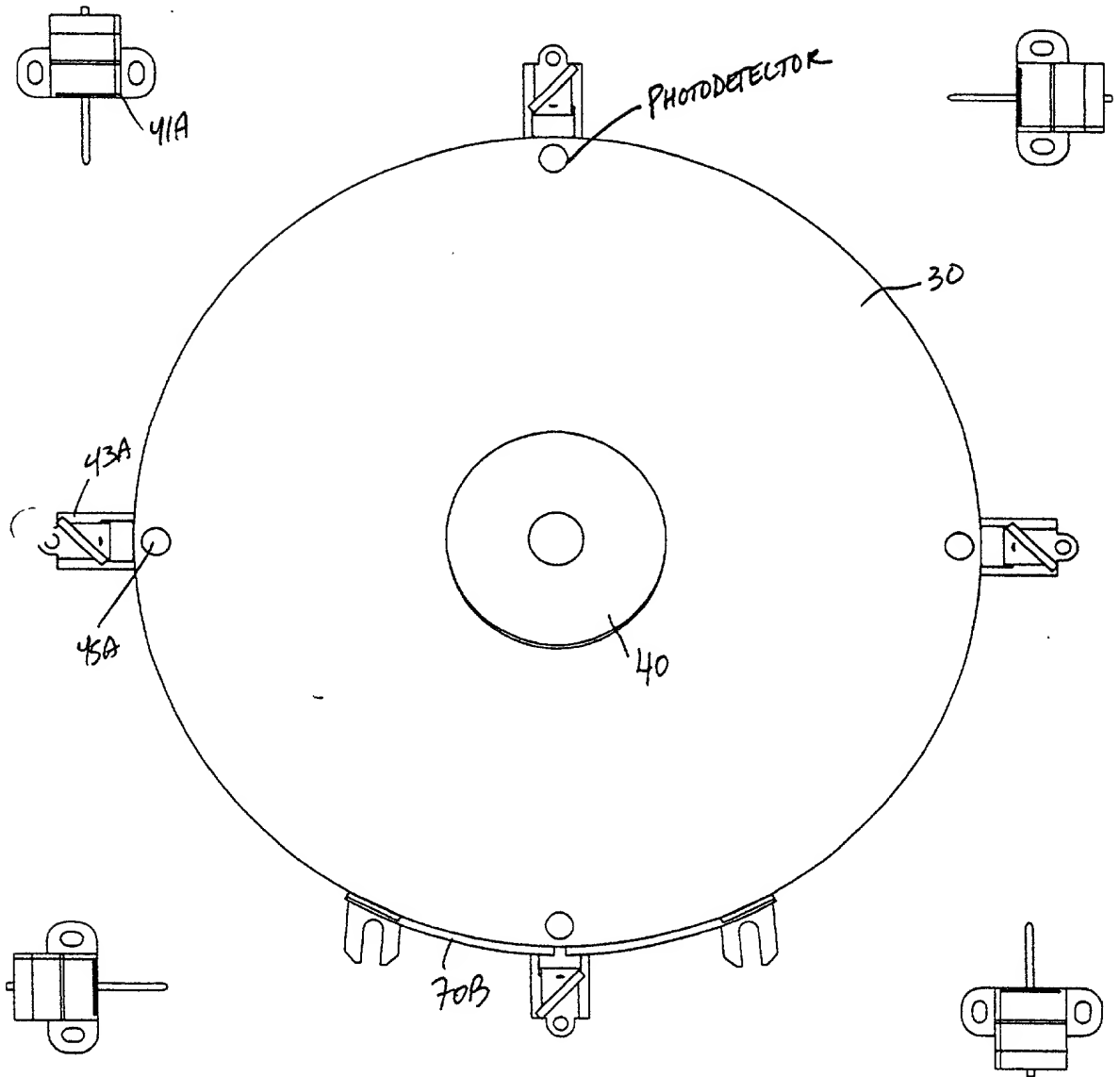


FIG. 2J1

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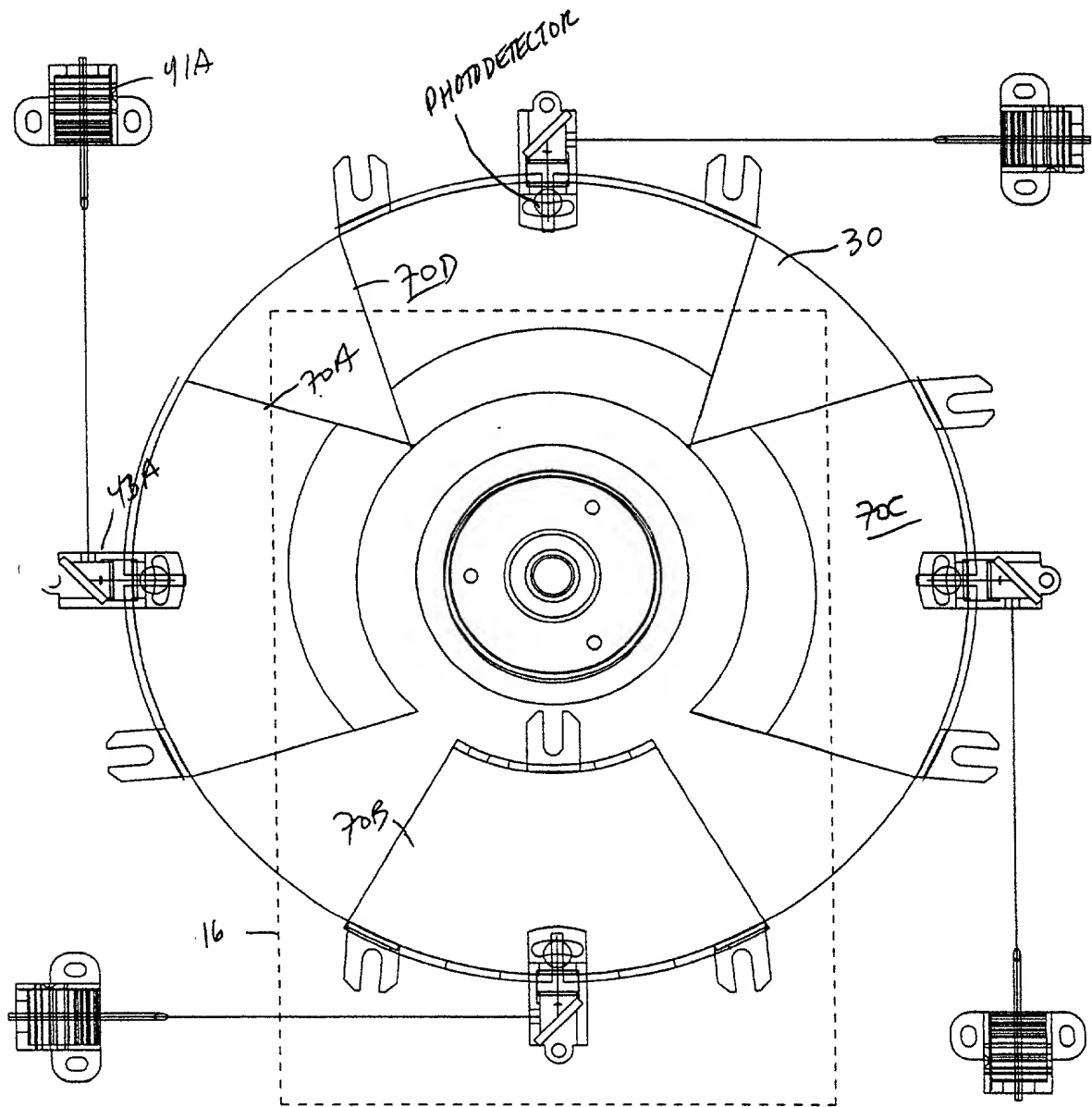


FIG. 2J2

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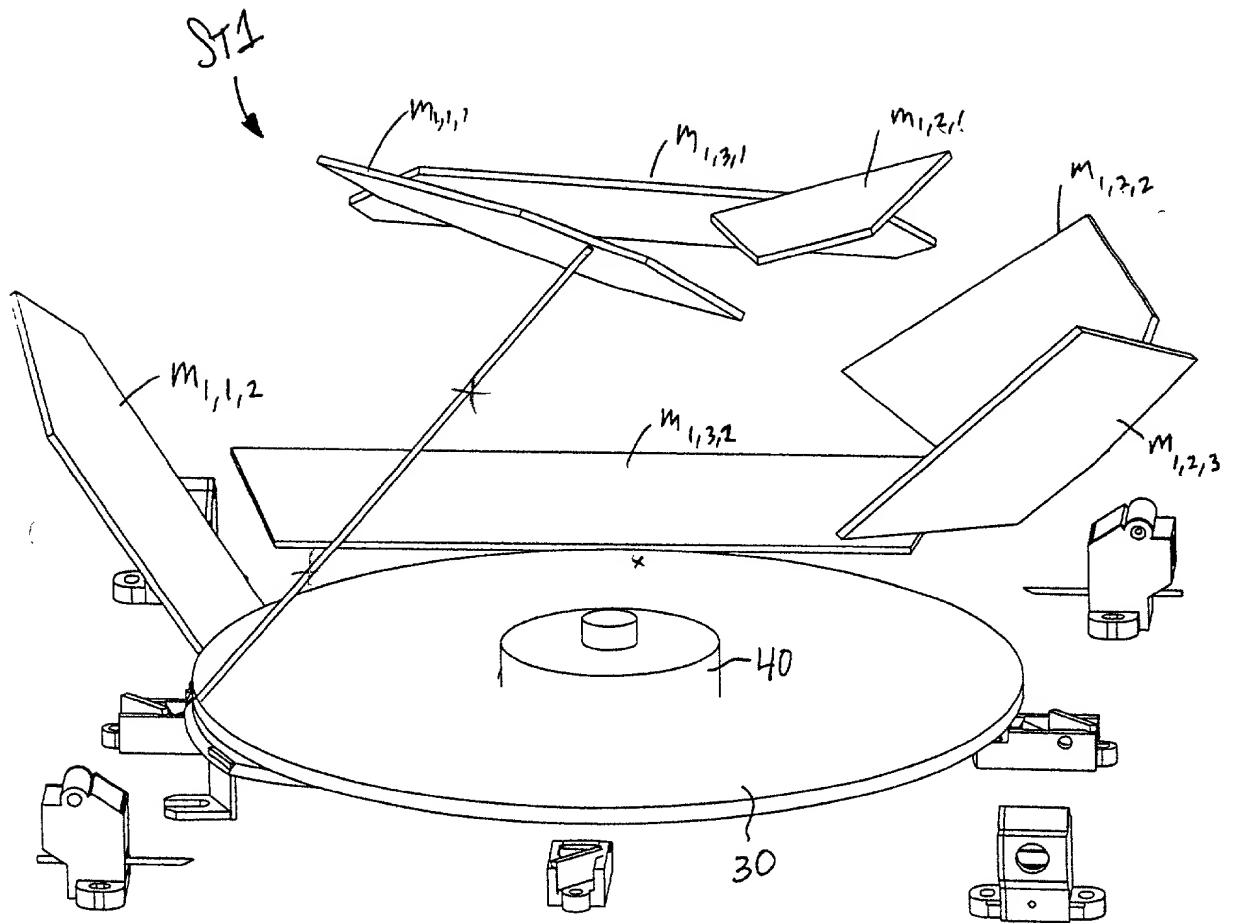


FIG. 2K

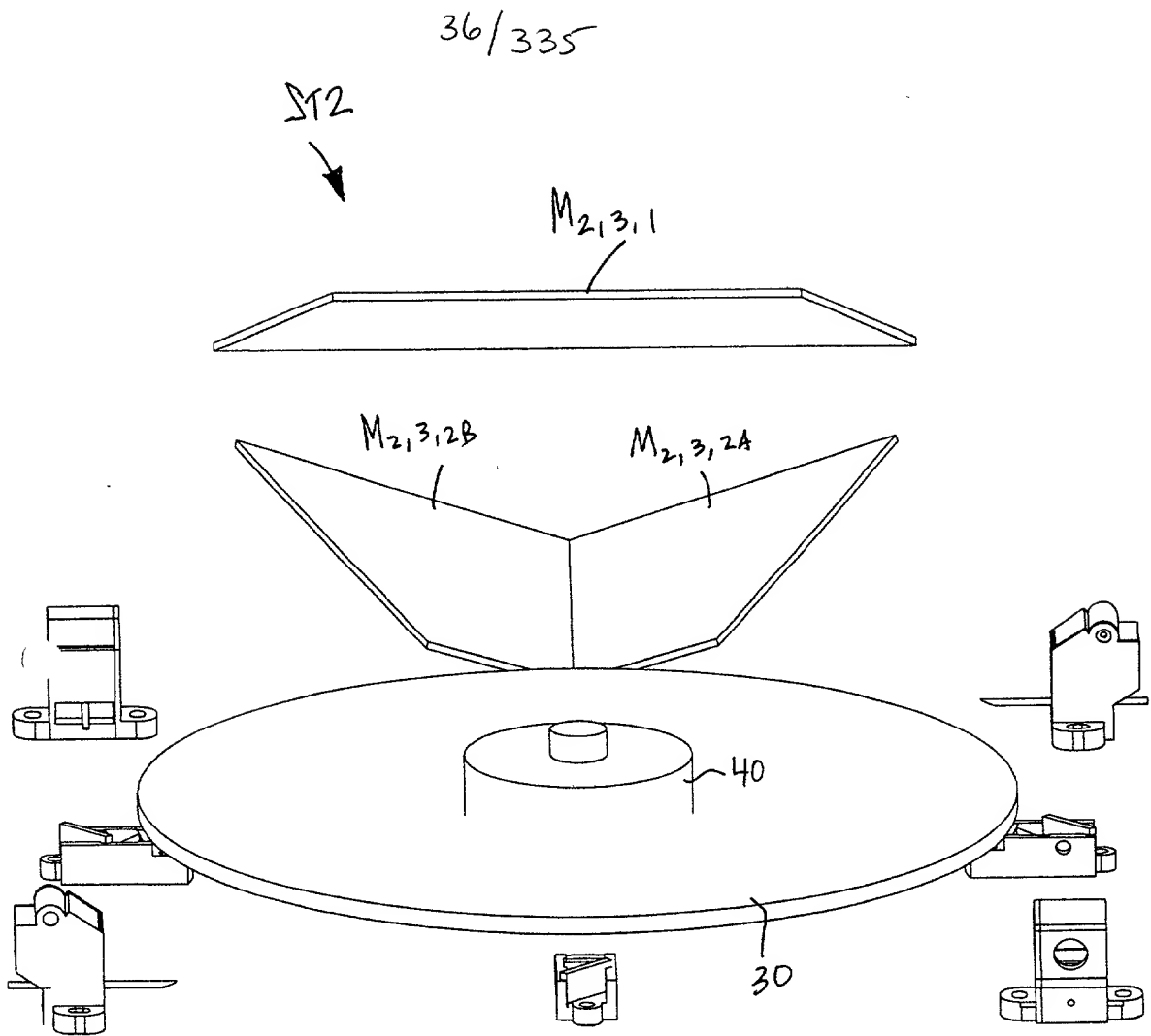


FIG. 2L

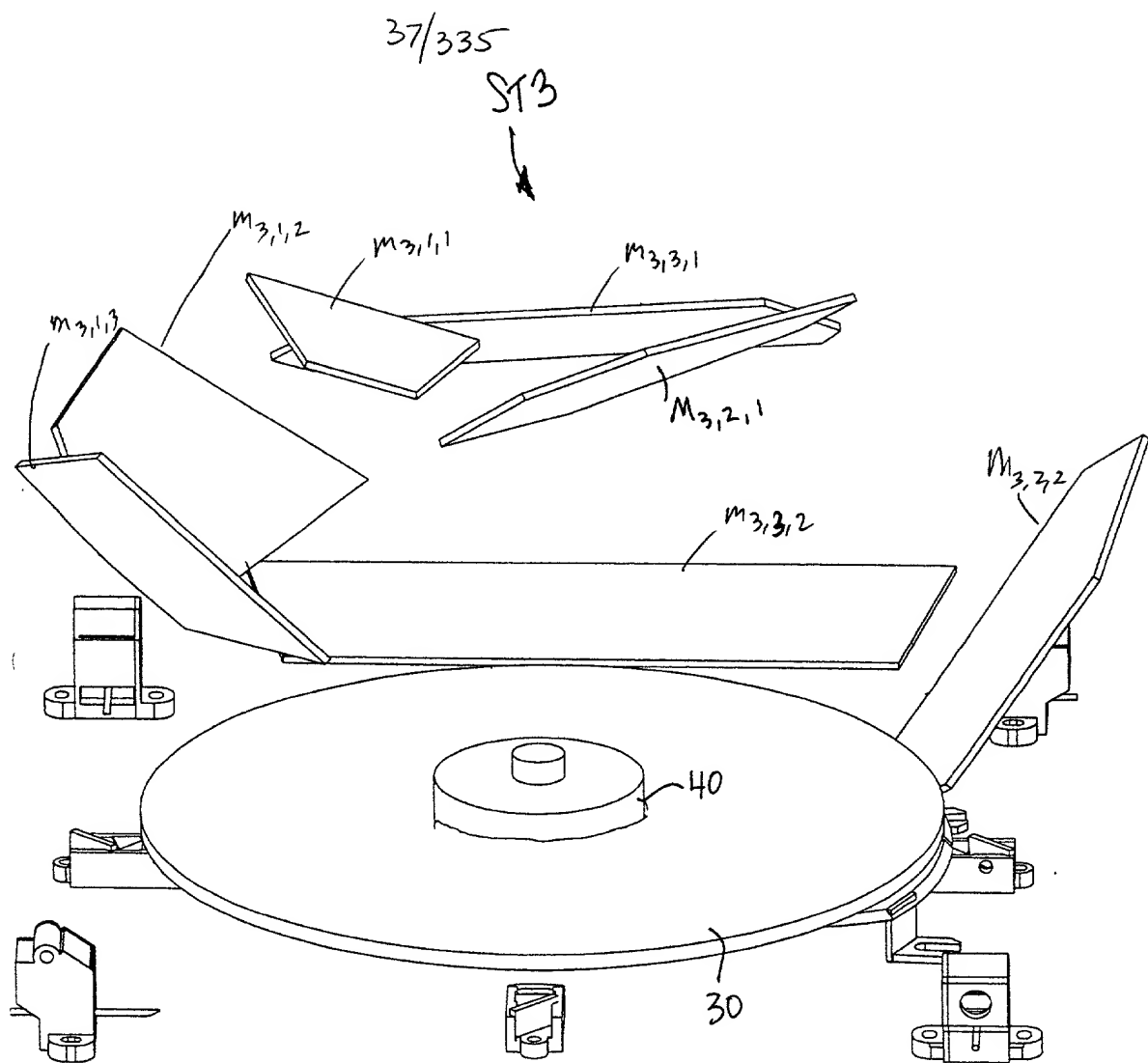


FIG. 2M

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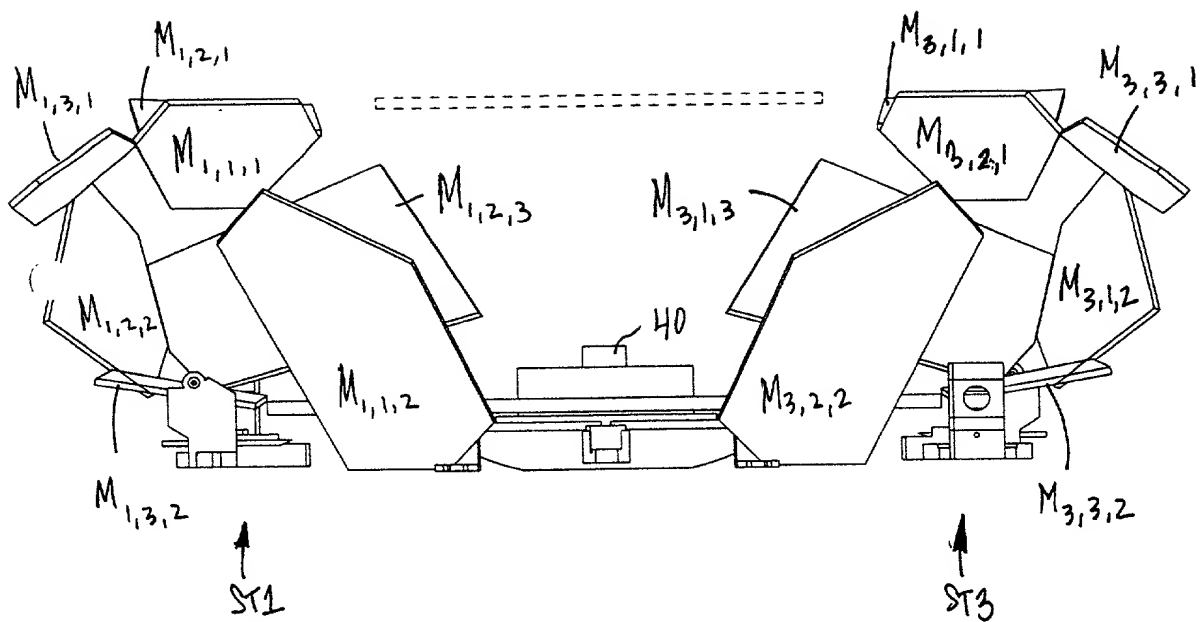


FIG. 2N

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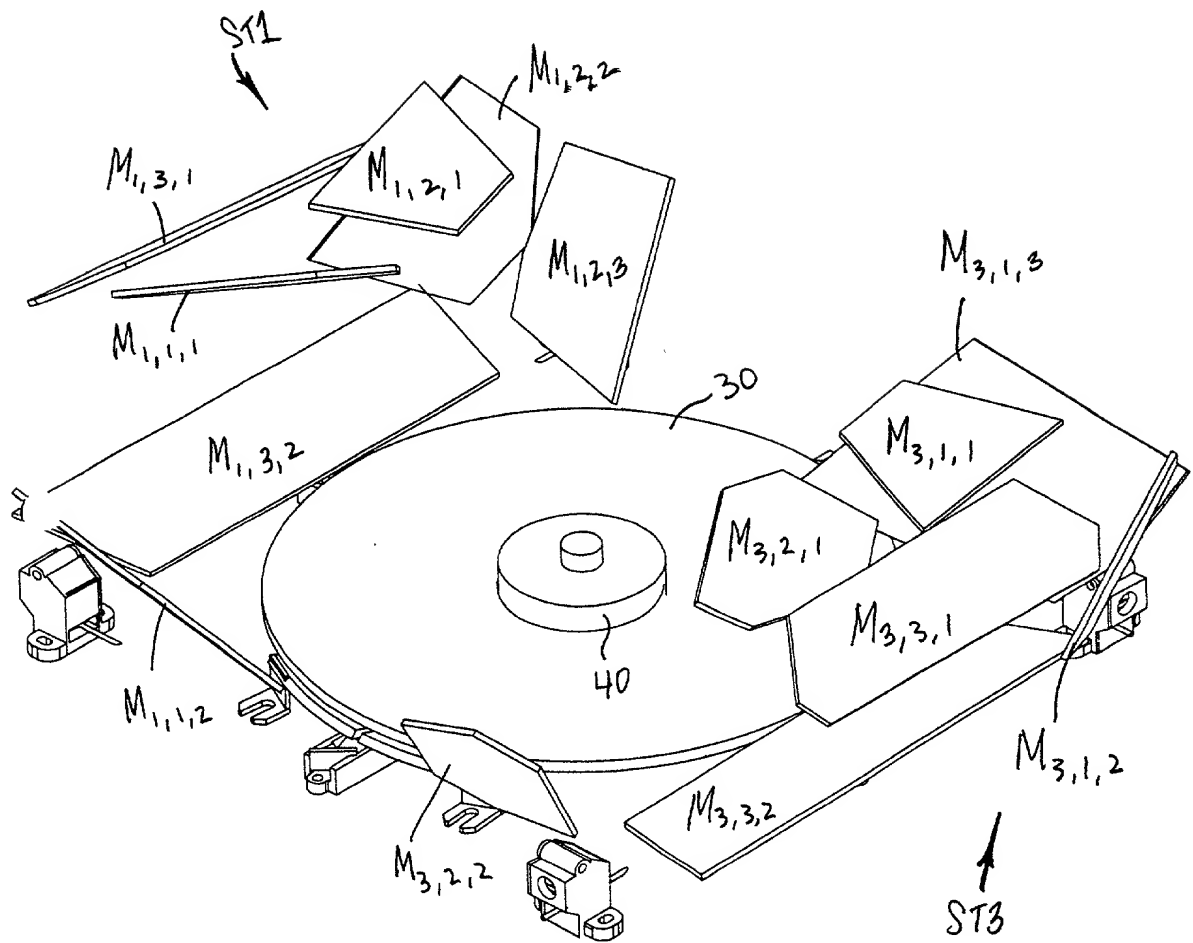


FIG. 20

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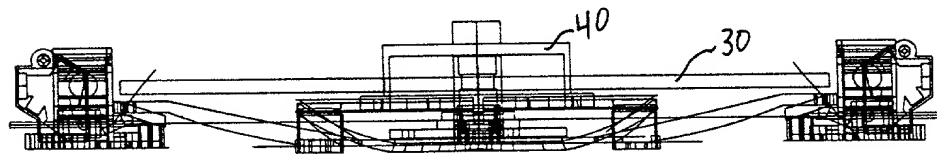
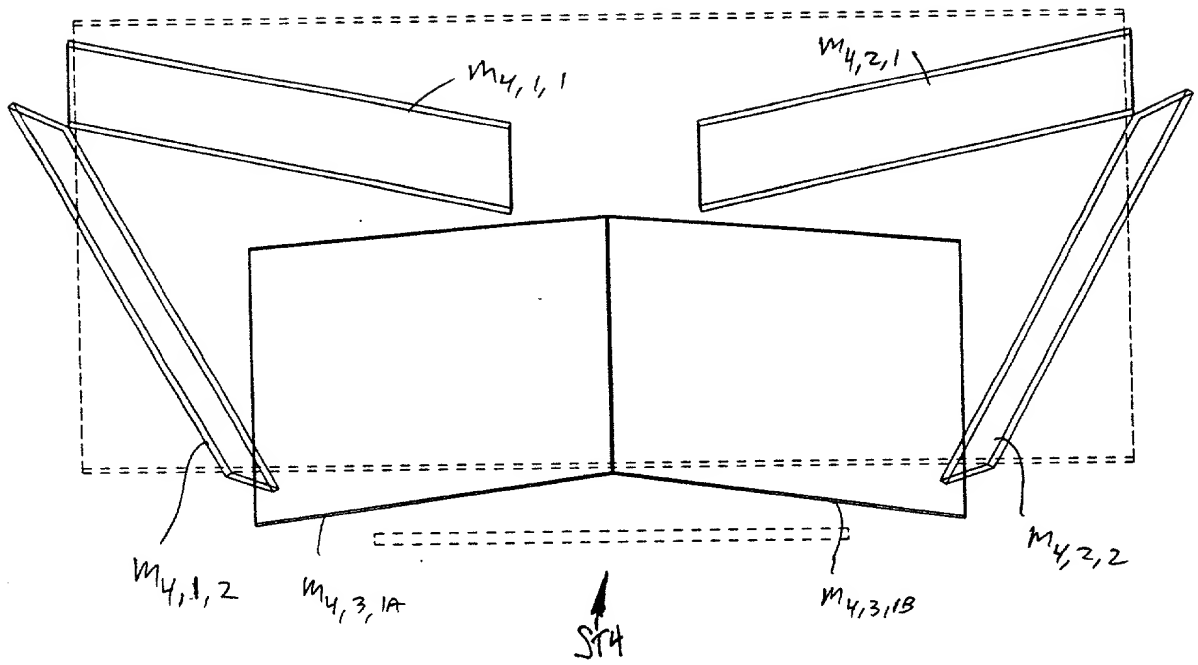


FIG. 2P

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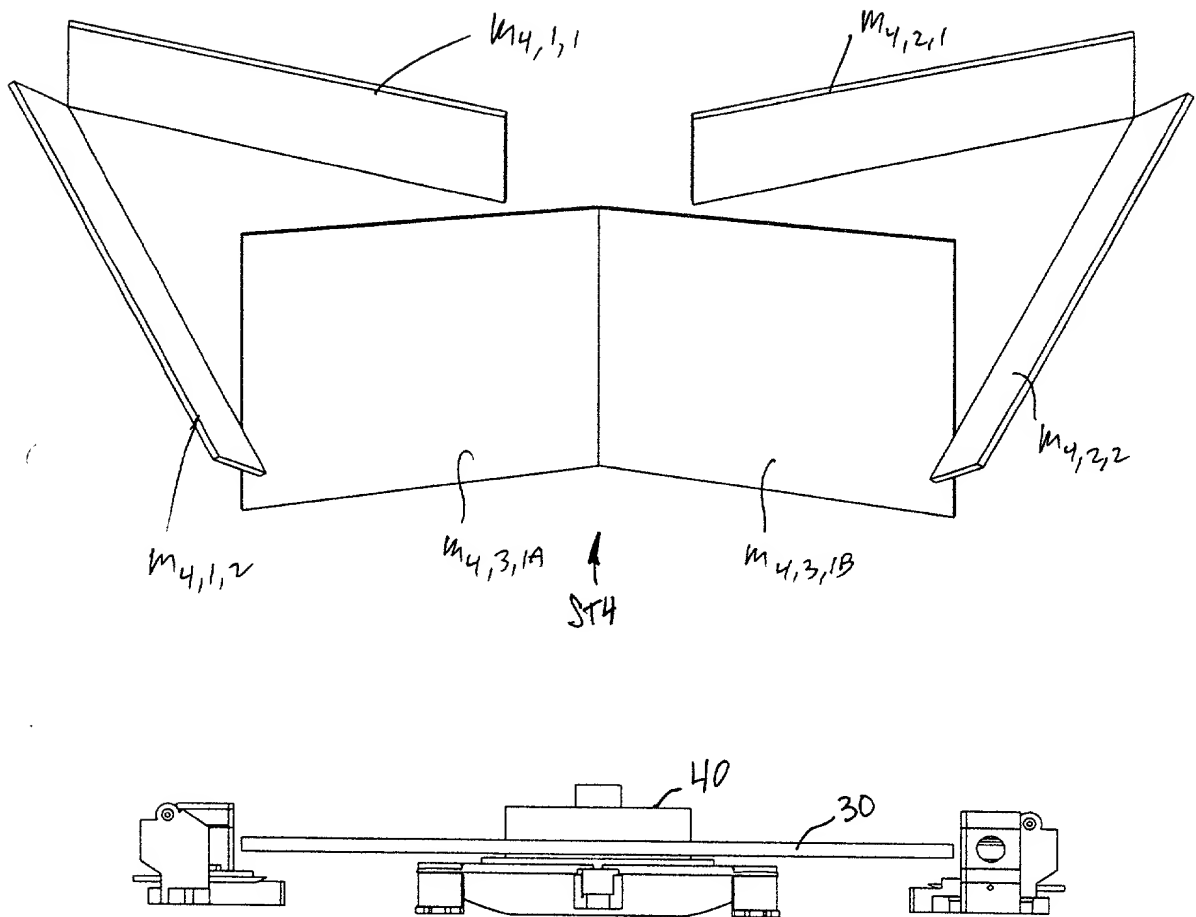


FIG. 2Q

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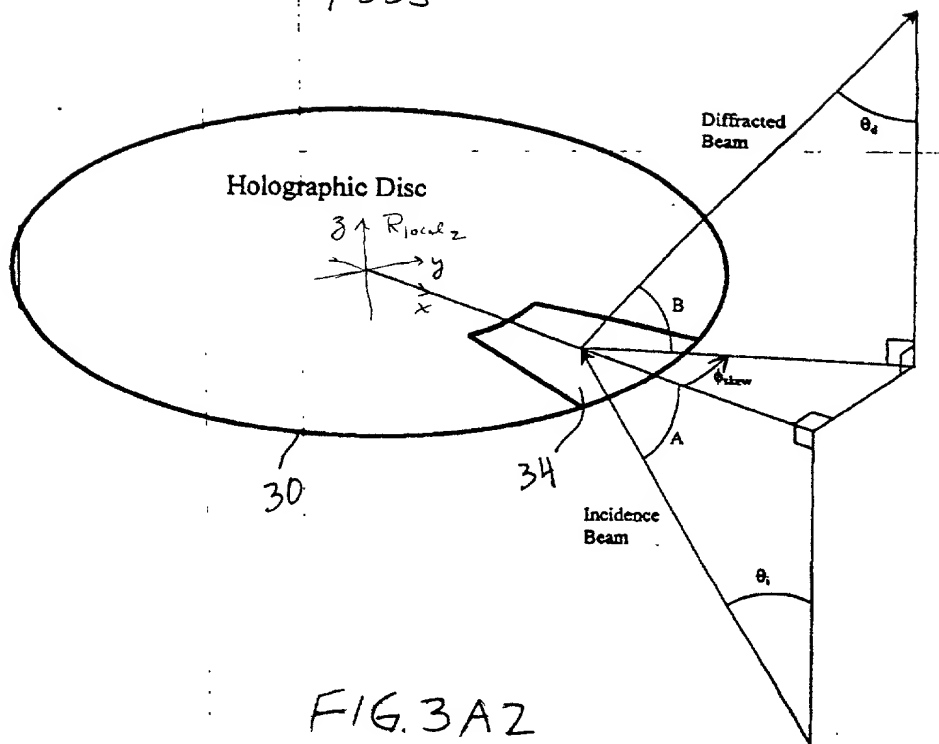


FIG. 3A2

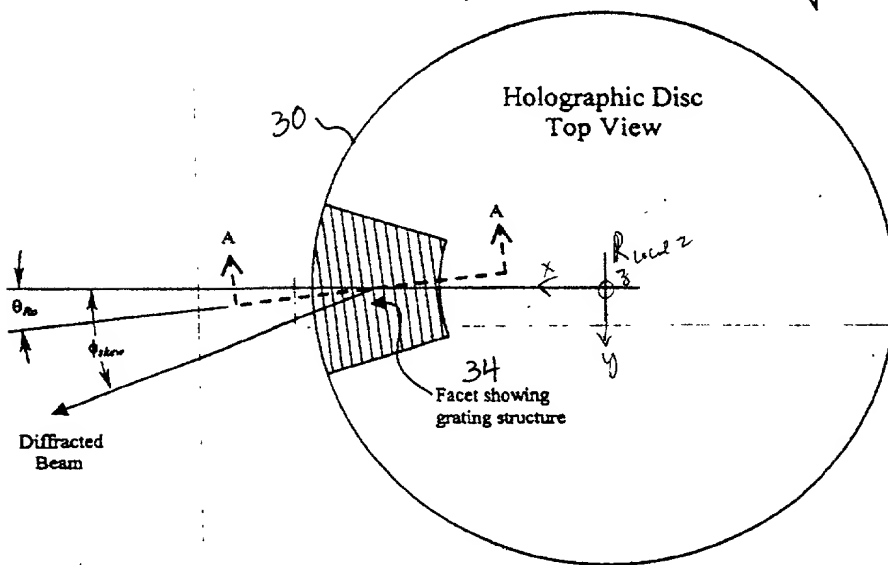


FIG. 3A3

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ELEVATION AND SKEW ANGLE CHARACTERISTICS OF FACETS ON
HOLOGRAPHIC SCANNING DISK OF THE PRESENT INVENTION

FACET GROUP NO.	G1	HIGH ELEVATION ANGLE LEFT SKEW ANGLE	FACET NO.
			7
			9
			11
	G2	HIGH ELEVATION ANGLE RIGHT SKEW ANGLE	FACET NO.
			8
			10
			12
	G3	LOW ELEVATION ANGLE NO/ZERO SKEW ANGLE	FACET NO.
			1
			2
			3
			4
			5
			6

FIG. 3A4

Figure 3B shows the results of the analysis of the data from the 1000th test run. The data shows that the system is stable and the results are consistent with the expected values.

MG2@ST1 MG1@ST1 MG3@ST1

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Station 1 (Local Co-ordinates)															
2	(Left)															
3	First Mirror	Negative skew														
4		x	y	z		x	y	z			No Skew (Z=125)					
5		2.55	-1.80	2.70		3.80	2.30	2.77			x	y	z			
6		4.15	-2.27	2.77		4.10	1.88	2.40			4.30	1.60	2.52			
7	M _{1,2,3}	3.95	0.23	2.05		4.10	1.88	2.40			4.95	2.15	2.04			
8		2.42	-0.24	2.25		3.10	-0.80	1.80			5.20	2.00	1.83			
9		2.55	-1.80	2.70		2.50	-0.16	2.45			4.70	-2.10	1.87			
10						2.65	0.76	2.77			4.10	-1.60	2.40			
11	Second Mirror					3.80	2.30	2.77			4.30	1.60	2.52			
12		x	y	z		x	y	z			x	y	z			
13		4.00	-2.63	0.05		1.70	4.10	1.30			3.10	2.60	-0.03			
14		4.90	-1.40	0.77		3.00	4.45	1.98			4.50	3.00	0.22			
15	M _{1,2,3}	4.60	-3.20	2.18		4.10	3.40	3.99			4.35	-2.30	0.30			
16		3.70	-4.10	1.06		2.30	2.43	-0.63			3.10	3.00	-2.00	0.04		
17		4.00	-2.63	0.05		1.40	2.57	-0.63			3.10	2.60	-0.03			
18						1.00	2.99	-0.20								
19	Third Mirror					1.70	4.10	1.30								
20		x	y	z												
21		4.41	-4.10	1.10												
22		1.97	-3.30	2.20												
23	M _{1,2,3}	1.12	-1.60	0.80												
24		2.51	-2.00	0.10												
25		3.53	-2.70	0.10												
26		4.41	-4.10	1.10												
27																
28																

FIG. 3B

Figure 30: A diagram showing the relationship between the mirror shapes and the resulting image. The diagram includes a coordinate system with x and y axes, and a series of points labeled 1 through 10. The points are arranged in a grid, with the x-axis ranging from 0 to 10 and the y-axis ranging from 0 to 10. The points are labeled as follows: 1 (0,0), 2 (1,0), 3 (2,0), 4 (3,0), 5 (4,0), 6 (5,0), 7 (6,0), 8 (7,0), 9 (8,0), 10 (9,0). The diagram also shows a series of lines connecting the points, forming a grid. The lines are labeled with the coordinates of the points they connect. For example, the line connecting point 1 to point 2 is labeled (1,0). The diagram is a 10x10 grid of points and lines.

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
30																
31	Station 2 (Local Co-ordinates)															
32		Negative skew														
33	First Mirror	x	y	z												
34																
35																
36																
37																
38																
39																
40																
41																
42	Second Mirror	x	y	z												
43																
44																
45																
46																
47																
48																
49																
50																
51																
52																

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FIG. 3C

Mirror Summary

Mirror Shapes

Symbol	Definition	Symbol	Definition
\mathbf{A}	Matrix	\mathbf{B}	Matrix
\mathbf{C}	Matrix	\mathbf{D}	Matrix
\mathbf{E}	Matrix	\mathbf{F}	Matrix
\mathbf{G}	Matrix	\mathbf{H}	Matrix
\mathbf{I}	Matrix	\mathbf{J}	Matrix
\mathbf{K}	Matrix	\mathbf{L}	Matrix
\mathbf{M}	Matrix	\mathbf{N}	Matrix
\mathbf{O}	Matrix	\mathbf{P}	Matrix
\mathbf{Q}	Matrix	\mathbf{R}	Matrix
\mathbf{S}	Matrix	\mathbf{T}	Matrix
\mathbf{U}	Matrix	\mathbf{V}	Matrix
\mathbf{W}	Matrix	\mathbf{X}	Matrix
\mathbf{Y}	Matrix	\mathbf{Z}	Matrix
\mathbf{a}	Vector	\mathbf{b}	Vector
\mathbf{c}	Vector	\mathbf{d}	Vector
\mathbf{e}	Vector	\mathbf{f}	Vector
\mathbf{g}	Vector	\mathbf{h}	Vector
\mathbf{i}	Vector	\mathbf{j}	Vector
\mathbf{k}	Vector	\mathbf{l}	Vector
\mathbf{m}	Vector	\mathbf{n}	Vector
\mathbf{o}	Vector	\mathbf{p}	Vector
\mathbf{q}	Vector	\mathbf{r}	Vector
\mathbf{s}	Vector	\mathbf{t}	Vector
\mathbf{u}	Vector	\mathbf{v}	Vector
\mathbf{w}	Vector	\mathbf{x}	Vector
\mathbf{y}	Vector	\mathbf{z}	Vector
\mathbf{A}^T	Transpose of \mathbf{A}	\mathbf{B}^T	Transpose of \mathbf{B}
\mathbf{C}^T	Transpose of \mathbf{C}	\mathbf{D}^T	Transpose of \mathbf{D}
\mathbf{E}^T	Transpose of \mathbf{E}	\mathbf{F}^T	Transpose of \mathbf{F}
\mathbf{G}^T	Transpose of \mathbf{G}	\mathbf{H}^T	Transpose of \mathbf{H}
\mathbf{I}^T	Transpose of \mathbf{I}	\mathbf{J}^T	Transpose of \mathbf{J}
\mathbf{K}^T	Transpose of \mathbf{K}	\mathbf{L}^T	Transpose of \mathbf{L}
\mathbf{M}^T	Transpose of \mathbf{M}	\mathbf{N}^T	Transpose of \mathbf{N}
\mathbf{O}^T	Transpose of \mathbf{O}	\mathbf{P}^T	Transpose of \mathbf{P}
\mathbf{Q}^T	Transpose of \mathbf{Q}	\mathbf{R}^T	Transpose of \mathbf{R}
\mathbf{S}^T	Transpose of \mathbf{S}	\mathbf{T}^T	Transpose of \mathbf{T}
\mathbf{U}^T	Transpose of \mathbf{U}	\mathbf{V}^T	Transpose of \mathbf{V}
\mathbf{W}^T	Transpose of \mathbf{W}	\mathbf{X}^T	Transpose of \mathbf{X}
\mathbf{Y}^T	Transpose of \mathbf{Y}	\mathbf{Z}^T	Transpose of \mathbf{Z}
\mathbf{a}^T	Transpose of \mathbf{a}	\mathbf{b}^T	Transpose of \mathbf{b}
\mathbf{c}^T	Transpose of \mathbf{c}	\mathbf{d}^T	Transpose of \mathbf{d}
\mathbf{e}^T	Transpose of \mathbf{e}	\mathbf{f}^T	Transpose of \mathbf{f}
\mathbf{g}^T	Transpose of \mathbf{g}	\mathbf{h}^T	Transpose of \mathbf{h}
\mathbf{i}^T	Transpose of \mathbf{i}	\mathbf{j}^T	Transpose of \mathbf{j}
\mathbf{k}^T	Transpose of \mathbf{k}	\mathbf{l}^T	Transpose of \mathbf{l}
\mathbf{m}^T	Transpose of \mathbf{m}	\mathbf{n}^T	Transpose of \mathbf{n}
\mathbf{o}^T	Transpose of \mathbf{o}	\mathbf{p}^T	Transpose of \mathbf{p}
\mathbf{q}^T	Transpose of \mathbf{q}	\mathbf{r}^T	Transpose of \mathbf{r}
\mathbf{s}^T	Transpose of \mathbf{s}	\mathbf{t}^T	Transpose of \mathbf{t}
\mathbf{u}^T	Transpose of \mathbf{u}	\mathbf{v}^T	Transpose of \mathbf{v}
\mathbf{w}^T	Transpose of \mathbf{w}	\mathbf{x}^T	Transpose of \mathbf{x}
\mathbf{y}^T	Transpose of \mathbf{y}	\mathbf{z}^T	Transpose of \mathbf{z}

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[illegible]

FIG. 3D

Mirror Summary

Mirror Shapes

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Station 47/335

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
83	Station 4	(Local Co-ordinates)														
84		(K) Negative skew														
85	First Mirror	x	y	z	(L) Positive Skew											
86		4.90	-0.80	6.41	x	y	z	No Skew								
87		6.10	-0.80	5.65	4.90	0.80	6.41	x	y	z	No Skew					
88		6.00	-4.50	6.47	6.10	0.80	5.65	6.70	0.00	5.61	x	y	z	No Skew		
89		4.90	-4.50	7.17	6.00	4.50	6.47	7.40	0.00	3.32	6.70	0.00	3.32	7.40	0.00	3.32
90		4.90	-4.50	7.17	4.90	4.50	7.17	6.95	-3.00	2.90	6.20	-3.00	2.90	6.95	3.00	2.90
91		4.90	-0.80	6.41	4.90	0.80	6.41	6.70	0.00	5.61	6.20	0.00	5.61	6.70	0.00	5.61
92								(Split mirror for generating two sets of horizontal lines)								
93																
94	Second Mirror	x	y	z	x	y	z									
95		2.85	-3.20	3.37	2.85	3.20	3.37	x	y	z						
96		4.20	-2.80	3.23	4.20	2.80	3.23									
97		5.95	-4.50	6.46	5.95	4.50	6.46									
98		4.60	-4.95	6.68	4.60	4.95	6.68									
99		2.85	-3.20	3.37	2.85	3.20	3.37									
100																

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FIG. 3E

Mirror Summary

Mirror Shapes

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*** Table of I	Dependent Parameters for both the Scanner and the Disk ***			Disk Str.	43	Problem Items are highlighted (red).
Box height (inches):			N/A	(See Note 1)		
Box width (inches):			N/A	(See Note 2)		
Max angle B (degrees):			62.00	(See Note 3)		
Min angle B (degrees):			38.00	(See Note 3)		
Total facet angular sweep (degrees):			358.14	(See Note 4)		
Min (angle A - angle B) (degrees):			0.00	(See Note 6)		
Max beam speed (inches per second):			13704			
Min beam speed (inches per second):			7158			
Power at data detector (nW):			872			
Signal voltage (volts):			5.47	(See Note 7)		
Signal voltage at max DOF limits (volts):			3.45	(See Note 7)		0.91 Max bandwidth (MHz) for 7.5 mil bars
CDRH: P-avg. Class 2? Class 2A?						
YES	YES	P-pulse Class 1?	YES	(See Note 8)		
Single pulse	P-avg. 0.25s	Pulse train correction				
PASS	PASS	PASS		(See Note 8)		
IEC:						
Note 1: If this entry is highlighted (red) then the value exceeds the specified value for the box height (Cell G21). Go to cells G417 to G456 to identify the problem entries and make the necessary inner radius adjustments in Cells G215 to G254.						
Note 2: This entry is not used in the box design, but it gives an indication of the box dimensions that would be established by the width of the tops of the mirrors.						
Note 3: Generally, the B angles should range between 40 degrees and 70 degrees. Holograms with smaller or larger angles may be difficult to construct.						
Note 4: This entry must be less than, but within a few degrees of, 360 degrees. To satisfy this requirement, it may be necessary to make adjustments to the focal distances and/or the length of the scan lines.						
Note 6: This value must be greater than 0.5 degrees to avoid feedback into the laser from disk surface reflections. If it is too small, adjustments must be made to the B angles of the problem facets (See Cells X468 to X507).						
Note 7: The signal voltage must be greater than some value established by the signal processor requirements. Typically, this value should be greater than 2 volts. If this value is less than 2 volts, either the laser power must be increased or the focal distances must be decreased.						
Note 8: All CDRH/IEC entries must be YES or PASS. If not, laser power must be reduced. (Modify laser power in Cell B799.)						

FIG. 3F

D. atc.

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d = distance from disk to base of scanner (inches):											
Rotational speed of disk (rpm)											
Disk/Stratos 4x1s											
Facet											
Geometrical											
Focal length (inches)											
Angle A (degrees)											
Angle B (degrees)											
Angle of Diffraction (degrees)											
Focal plane scan line length (inches)											
Scan Angle (degrees)											
Scan mult. Factor (m)											
Rotation Angle (degrees)											
Accounting for dead time for laser beam 1.15 (degrees)											
Light Collection Factor											
Maximum Collection Area (ignoring notch) (sq. in.)											
1	12.5	12.73	52	38.00	52.00	42.61	1.62	26.24	27.39	1.00	2.28
2	11.5	11.68	52	40.00	50.00	45.95	1.62	28.35	29.50	0.80	1.81
3	12.7	12.94	52	42.00	48.00	42.00	1.58	26.66	27.81	0.92	2.09
4	11.5	11.68	52	44.00	46.00	45.95	1.57	29.19	30.34	0.71	1.62
5	12.7	12.94	52	48.00	42.00	42.00	1.50	27.97	29.12	0.79	1.79
6	12.0	12.21	52	52.00	38.00	44.22	1.46	30.28	31.43	0.64	1.47
7	14.7	15.08	52	58.00	32.00	36.69	1.31	27.99	29.14	0.87	1.97
8	14.7	15.08	52	58.00	32.00	36.69	1.31	27.99	29.14	0.87	1.97
9	13.5	13.80	52	60.00	30.00	39.71	1.30	30.65	31.80	0.71	1.61
10	13.5	13.80	52	60.00	30.00	39.71	1.30	30.65	31.80	0.71	1.61
11	14.8	15.19	52	62.00	28.00	36.46	1.25	29.19	30.34	0.83	1.88
12	14.8	15.19	52	62.00	28.00	36.46	1.25	29.19	30.34	0.83	1.88

FIG. 3G1

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D., etc.

[illegible]

FIG. 3G2

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DiskStr. ra

*** Modified Exposure Angles to Correct for Post-processing Residual Gelatin Swell ***															
DiskStratos 4.xls															
Percent gelatin swell (from measurements) delta-t/t:															
Facet	Exposure angles at 488 nm			Exposure angles to compensate for swell			650 nm								
	Reference	Object	Beam	Reference	Object	Beam	gamma(sw)	gamma(0)	A	B	C	Z	alpha-0	beta-0	
	(degrees)	(degrees)	(degrees)	(degrees)	(degrees)	(degrees)									
1	25.13	38.99		23.85	40.50		-4.08	-4.90	1.99	1.99	0.17	0.69	0.26	15.33	25.12
2	25.45	37.42		24.34	36.70		-3.54	-4.25	1.99	1.99	0.15	0.68	0.27	15.62	24.12
3	25.78	35.82		24.83	36.88		-2.99	-3.58	1.99	1.99	0.12	0.67	0.27	15.93	23.10
4	26.12	34.20		25.35	35.04		-2.41	-2.90	1.99	1.99	0.10	0.66	0.28	16.25	22.04
5	26.81	30.90		26.41	31.31		-1.23	-1.48	2.00	2.00	0.05	0.63	0.29	16.90	19.86
6	27.53	27.53		27.53	27.53		0.00	0.00	2.00	2.00	0.00	0.60	0.30	17.58	17.58
7	28.64	22.38		29.28	21.77		1.92	2.31	2.00	2.00	-0.08	0.56	0.32	18.65	14.03
8	28.64	22.38		29.28	21.77		1.92	2.31	2.00	2.00	-0.08	0.56	0.32	18.65	14.03
9	29.02	20.64		29.89	19.83		2.58	3.10	1.99	1.99	-0.11	0.55	0.33	19.01	12.81
10	29.02	20.64		29.89	19.83		2.58	3.10	1.99	1.99	-0.11	0.55	0.33	19.01	12.81
11	29.40	18.89		30.50	17.89		3.25	3.90	1.99	1.99	-0.14	0.53	0.33	19.37	11.56
12	29.40	18.89		30.50	17.89		3.25	3.90	1.99	1.99	-0.14	0.53	0.33	19.37	11.56

FIG. 3I

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Figure 3J shows the spot size of the beam at the detector for the various values of the distance from the mirror to the detector. The spot size is shown in millimeters. The values are given for a beam diameter of 100 mm and a focal length of 400 mm.

L atos_4

*** Analysis of the Focus Shift and Out-of-focus Spot Size for Converging Reference Beam ***											
(Not applicable for Stratos)											
Convergence of the reference beam:											
Focal length of the parabolic mirror:											
Distance from parabolic mirror to detector:											
Facet	Design	Par. Mirror	Required	Object	Image	Image	Image	Image	Spot size		
	Focal length	Eff. width	foc. length	distance	distance	shift	shift	shift	at detector		
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		
1	317.50		40 404.42	-14858.75	59.05	-0.95			0.84		
2	292.10		40 364.09	31841.43	58.71	-1.29			0.88		
3	322.58		40 412.69	-11828.19	59.11	-0.89			0.60		
4	292.10		40 364.09	31841.43	58.71	-1.29			0.88		
5	322.58		40 412.69	-11828.19	59.11	-0.89			0.60		
6	304.80		40 384.03	-48230.76	58.89	-1.11			0.75		
7	373.38		40 499.67	4485.04	59.60	-0.40			0.27		
8	373.38		40 499.67	-4485.04	59.60	-0.40			0.27		
9	342.90		40 446.55	6818.26	59.33	-0.67			0.45		
10	342.90		40 446.55	-6818.26	59.33	-0.67			0.45		
11	375.92		40 504.23	-4375.15	59.62	-0.38			0.25		
12	375.92		40 504.23	4375.15	59.62	-0.38			0.25		

Distance (Cell E821) may have to be adjusted so that the maximum spot size at the detector is approximately the same when the 1/2 depth of field value is negative as it is when the 1/2 depth of field value is positive. (The 1/2 depth of field value is located at Cell G19)

FIG. 3J

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Focal distances and distances to the window for the Stratos scanner
LDD 12/7/99 RPH

Facet	Diffraction Focal length (inches)	Distance to			Operator side		
		horizontal window (inches)	Difference (inches)	vertical window (inches)	horizontal window (inches)	Difference (inches)	
1	12.5	8.5	4	10.2	2.3	8	4.5
2	11.5	8.8	2.7	10.2	1.3	8.42	3.08
3	12.7	9.2	3.5	10.2	2.5	8.85	3.85
4	11.5	9.5	2	10.2	1.3	9.25	2.25
5	12.7	9.8	2.9	10.2	2.5	9.7	3
6	12	10.2	1.8	10.2	1.8	10.1	1.9
7	14.7	10.6	4.1	14.1	0.6		
8	14.7	9.7	5	14.1	0.6		
9	13.5	11.2	2.3	13.8	-0.3		
10	13.5	9.8	3.7	13.8	-0.3		
11	14.8	11.1	3.7	13.6	1.2		
12	14.8	9.6	5.2	13.6	1.2		

The horizontal window lines from the even numbered vertical facets 8, 10, 12 are near the vertical window.

FIG. 3K

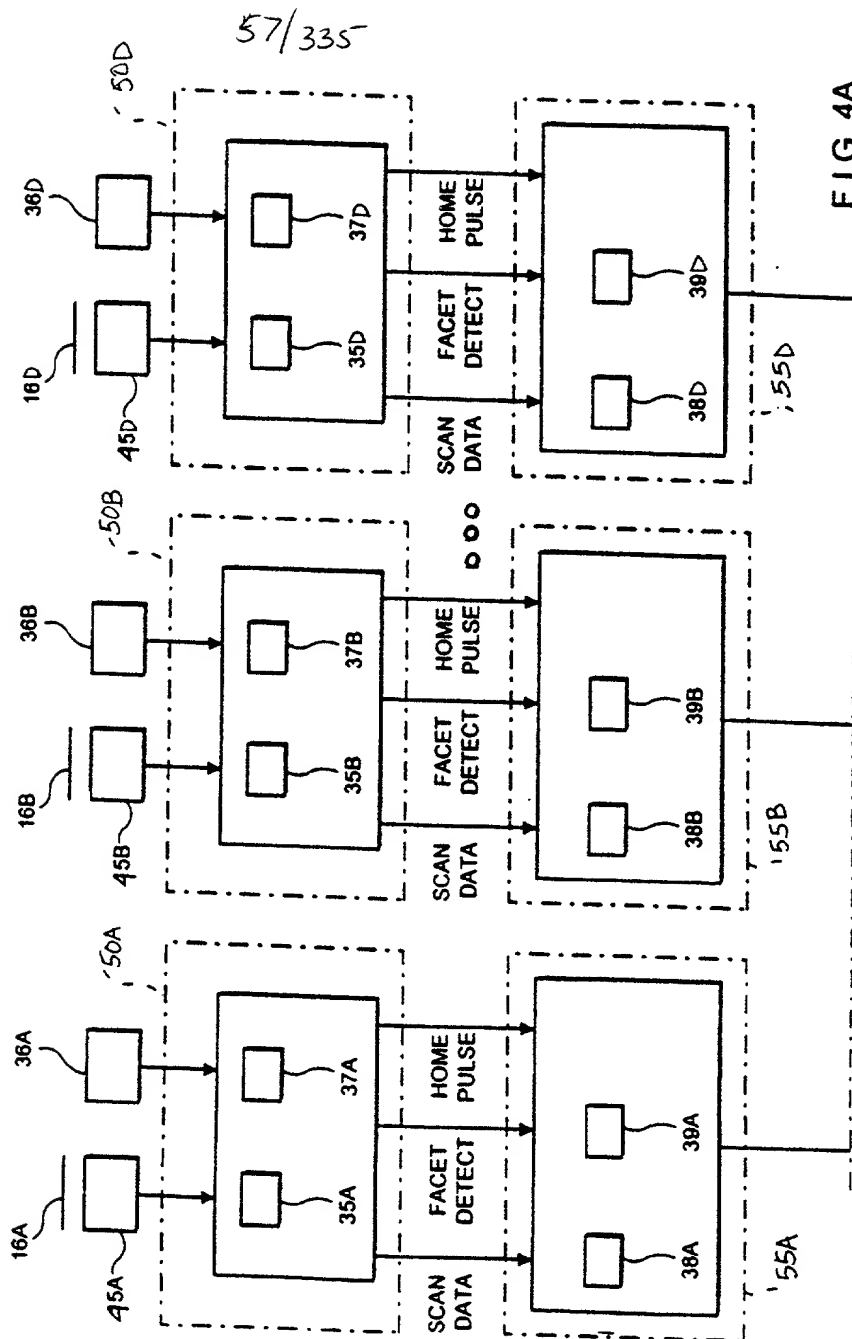
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* CDRH/IEC Calculations to Verify that the Scanner Meets the Laser Class Requirements ***									
The number of overlapping lines (N-overlap) must be determined from the scanner data. A safe assumption for our scanners is to consider that two scan lines are overlapped ONLY when the difference between their diffraction angles (B) is less than 2 degrees. All else being equal, the slowest scan lines (largest angle B) will be the worst case scan lines.									
N-overlap:	1								
Motor speed (rpm):			5200						
Alpha-min (radians):			0.0015	(from standard)					
FWHM P-divergence of laser (deg.):			8	(Linked from Trnc spreadsheet)					
FWHM S-divergence of laser (deg.):			30	(Linked from Trnc spreadsheet)					
Focal length of collimating lens (mm):			6.1	(Linked from Trnc spreadsheet)					
Angle of incidence at MF plate (deg.):			29.23						
Angle of diffraction at MF plate (deg.):			42.12						
X-p (mm):			0.87						
X-s (mm):			3.93						
Average source dimension (mm):			2.40						
Distance to aperture (mm):			200	(actual distance or 200 mm, whichever is greater)					
Alpha (radians):			0.012						
C6:			7.996						
Laser power at window (mW)									
tc (200) 7 mm transit time at d = 200 mm (seconds)									
ti (actual) 7 mm transit time at actual d (seconds)									
P x ti (Joules)									
Facet									Facet count
1	0.86	3.95856E-05	3.95856E-05	0.0000339					1
2	0.86	3.96549E-05	3.96549E-05	0.0000341					1
3	0.86	4.08001E-05	4.08001E-05	0.0000351					1
4	0.86	4.08315E-05	4.08315E-05	0.0000352					1
5	0.86	4.28115E-05	4.28115E-05	0.0000370					1
6	0.87	4.40086E-05	4.40086E-05	0.0000381					1
7	0.87	4.90358E-05	4.90358E-05	0.0000425					1
8	0.87	4.90358E-05	4.90358E-05	0.0000425					1
9	0.87	4.96126E-05	4.96126E-05	0.0000430					1
10	0.87	4.96126E-05	4.96126E-05	0.0000430					1
11	0.87	5.14525E-05	5.14525E-05	0.0000446					1
12	0.87	5.14525E-05	5.14525E-05	0.0000446					1

FIG. 3L1

FIG. 3L2

Sums:			0.000C DiskStc	0.0000446 4a	These values are the sums of the worst case (largest) overlap values
Duty Cycle:	0.004459213				
Paverage is the sum of the overlap P1 x ti products divided by the sum of the ti times times the duty cycle Paverage is, therefore, the sum of the overlap P1 x ti products times the rps of the motor.					
CDRH calculations and results					
Pavg. (mW):		0.003869	Class 1	Class 2?	Class 2A?
P (single pulse) (mW): (Maximum allowed)		8.27		YES	YES
P (single pulse) (Actual)		0.87	YES		
IEC calculations and results					
IEC condition A (Single pulse)					
P (single pulse) (mW): (Maximum allowed)		70.6			PASS/FAIL
IEC condition B (average power in a 0.25 second pulse train)					
Pavg. allowed (mW):		7.92			PASS/FAIL
Pavg. scanner (mW):		0.0039			PASS
IEC condition C (pulse train correction factor) (For this calculation, you need to insert the sum of the pulse times in the overlapping scan lines)					
T-total (seconds): (sum of pulse times in overlap scan lines)		0.000051			
Pmax (mW):		66.1			
Number of pulses in train:		21.67			
Correction factor:		0.4635			
Pmax (PT corrected)(mW):		30.63			PASS/FAIL
Pw (including overlap)		0.87			PASS



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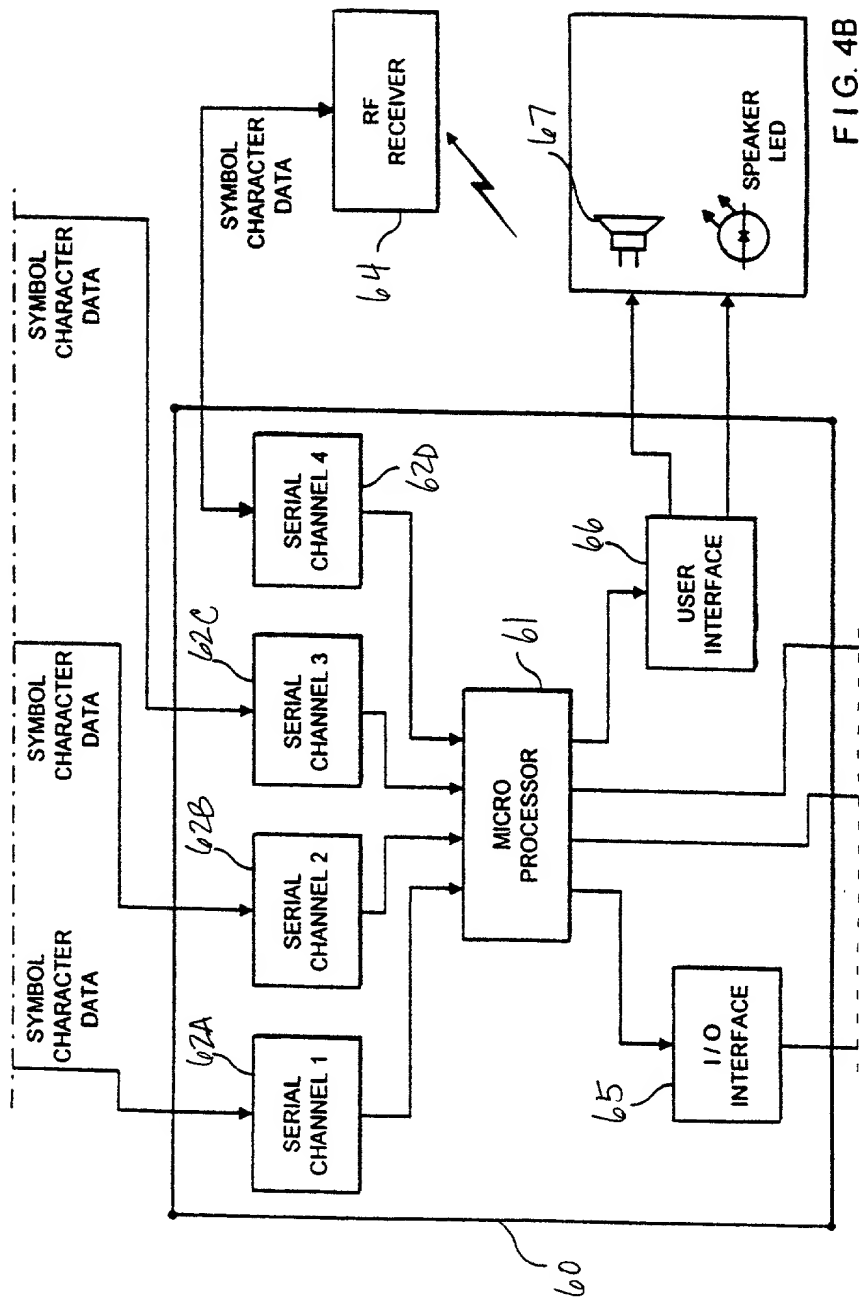


FIG. 4B

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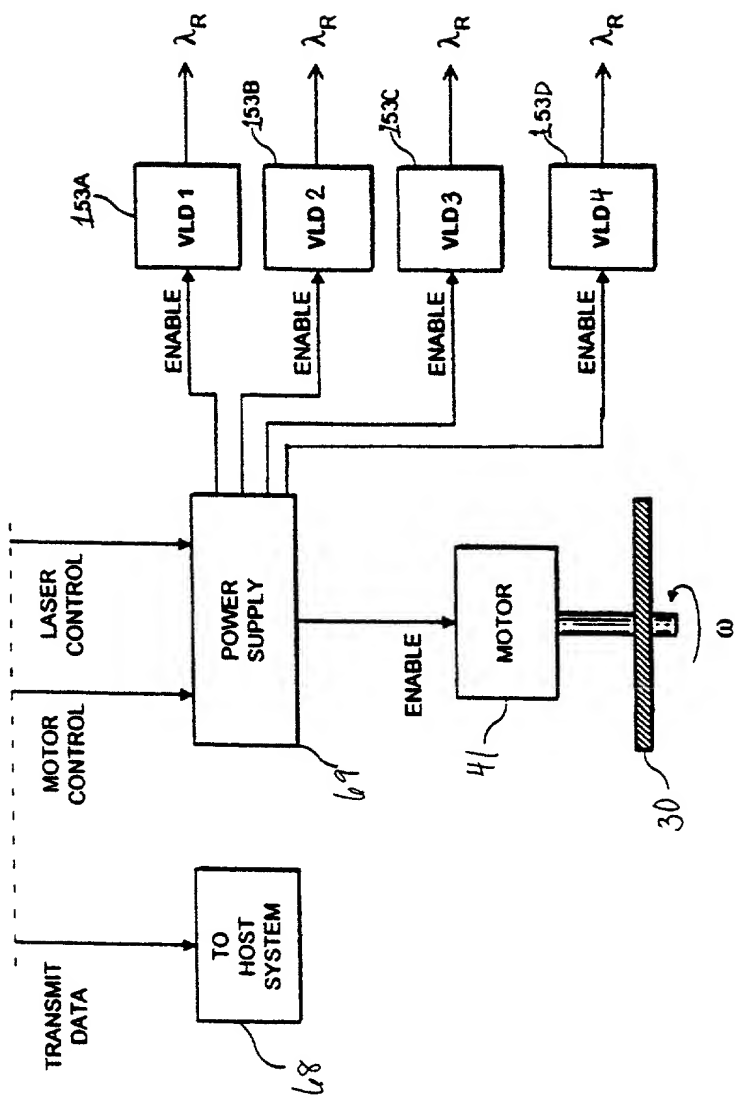


FIG. 4C

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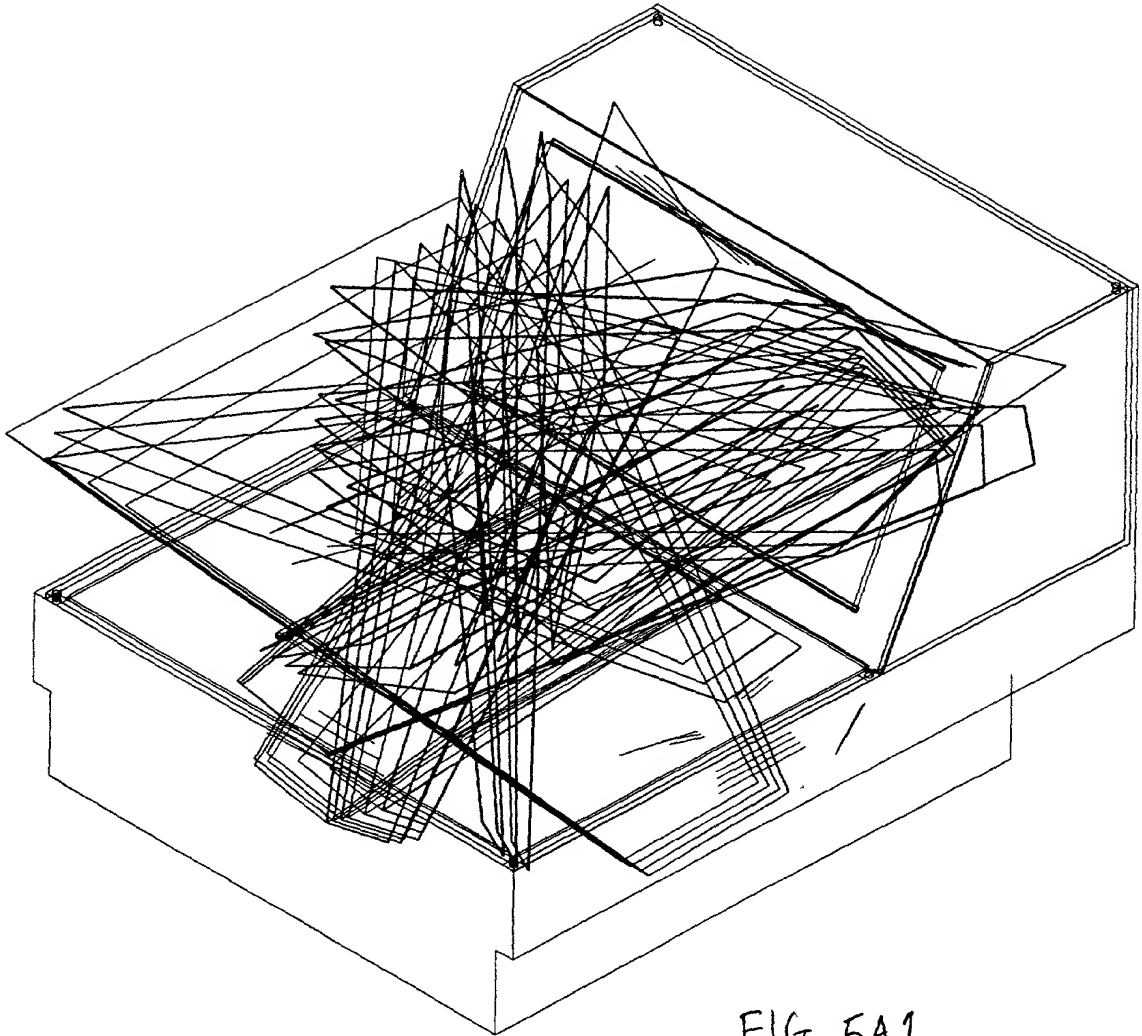


FIG. 5A1

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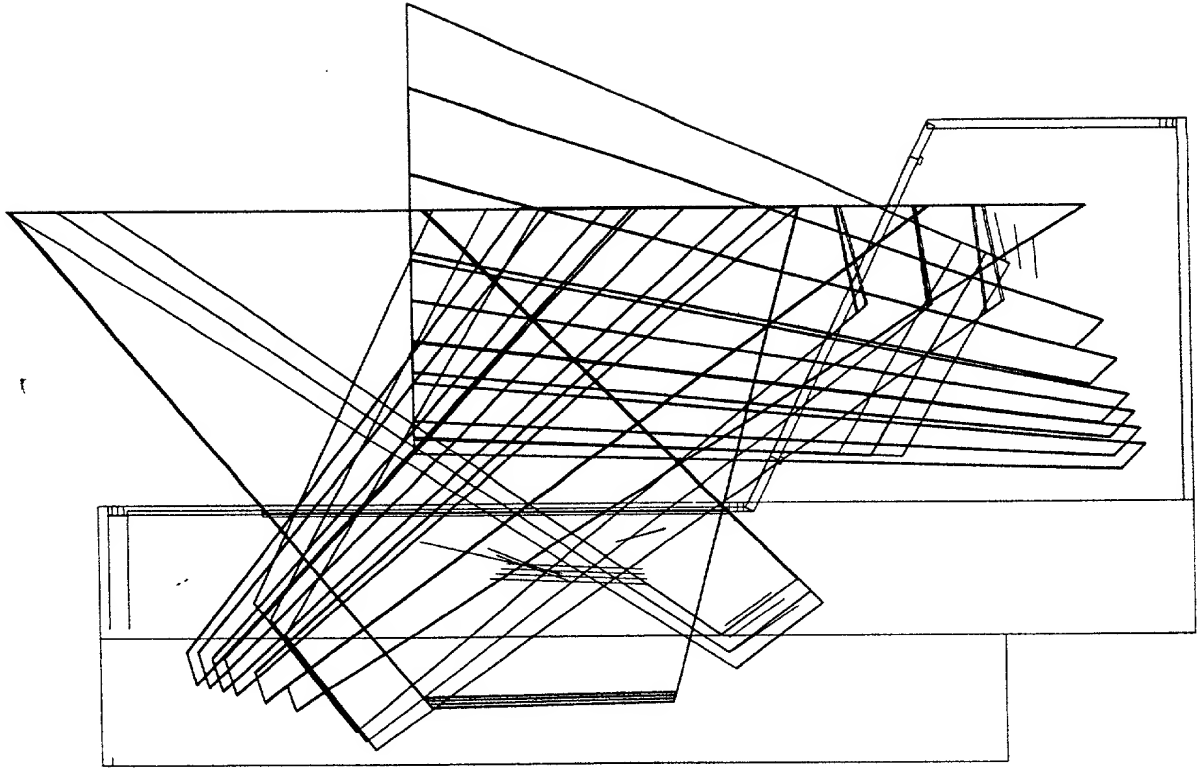


FIG. 5A2

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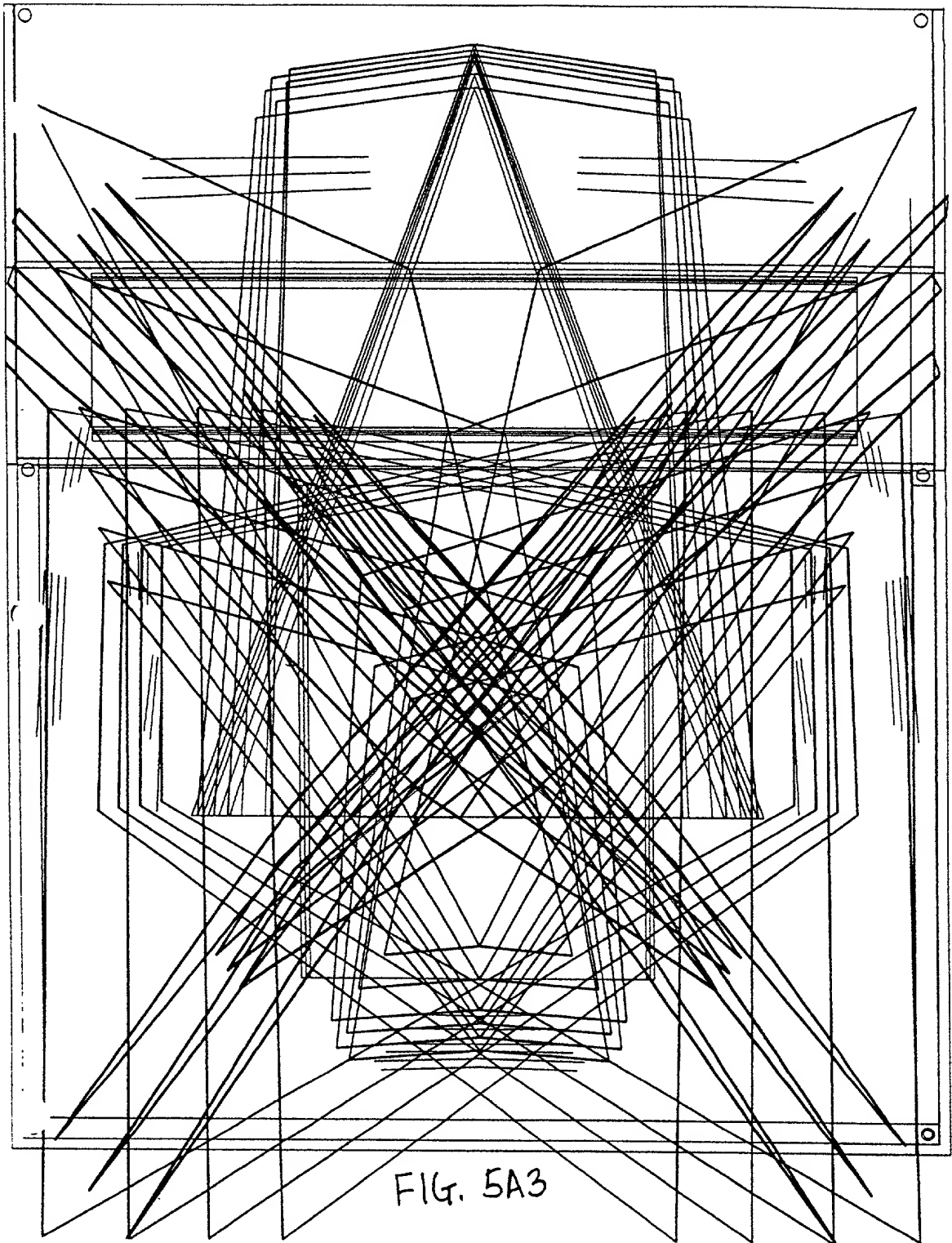


FIG. 5A3

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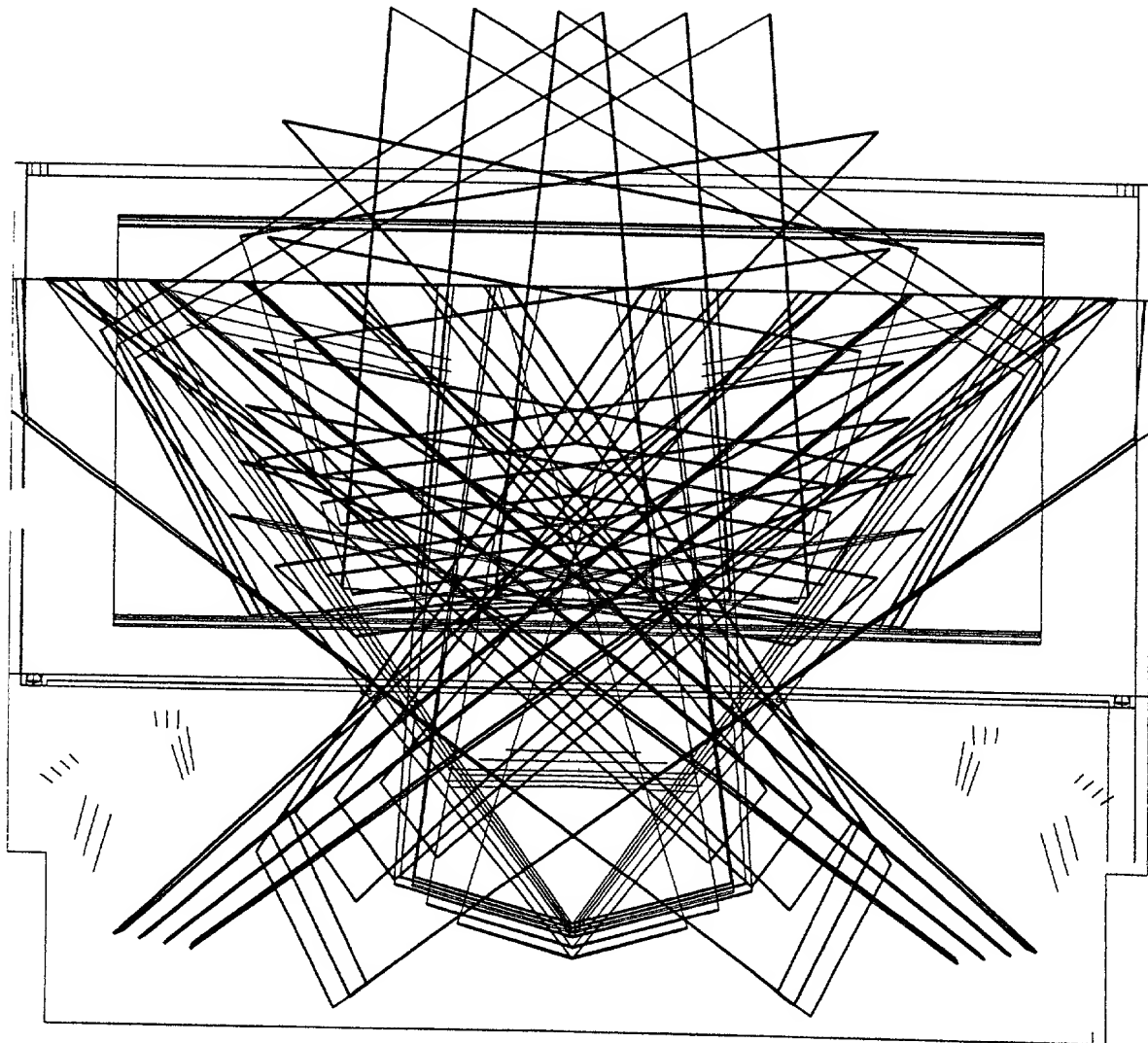


FIG. 5A4

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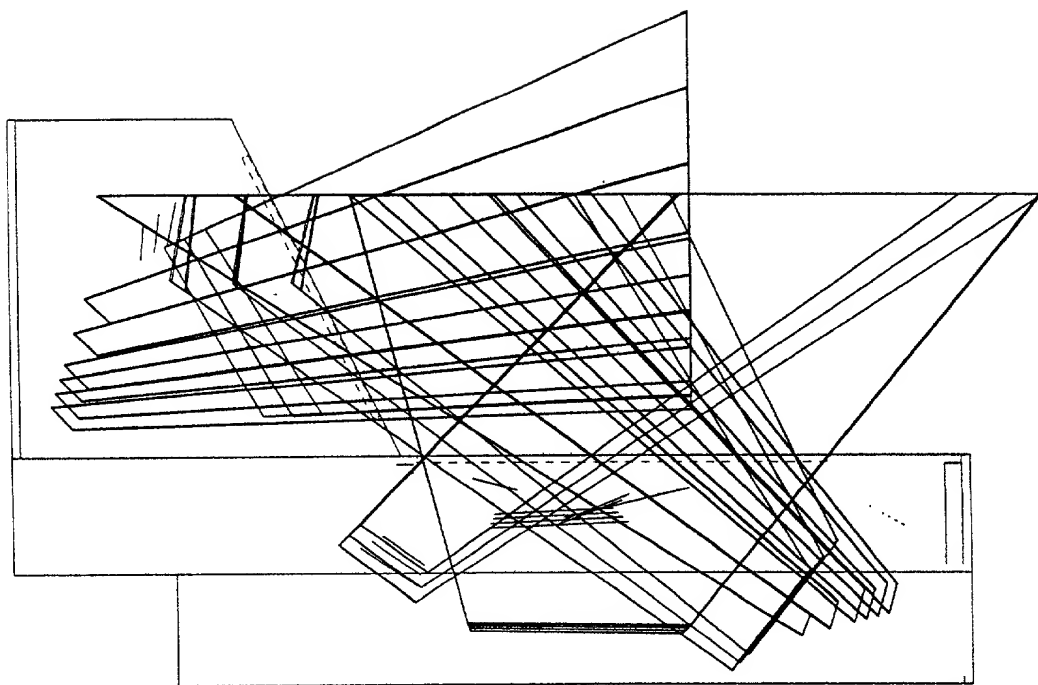


FIG. 5A5

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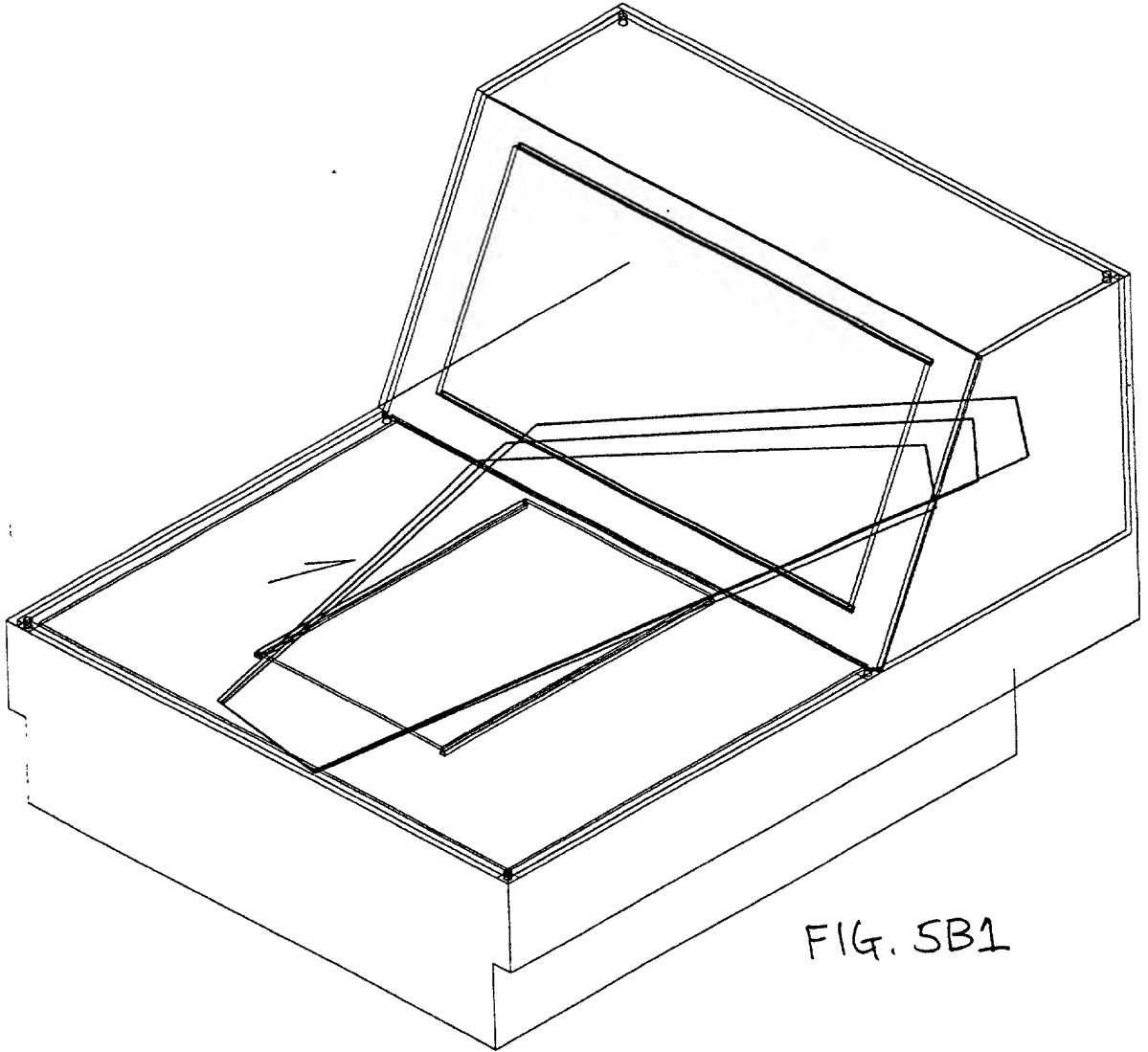


FIG. 5B1

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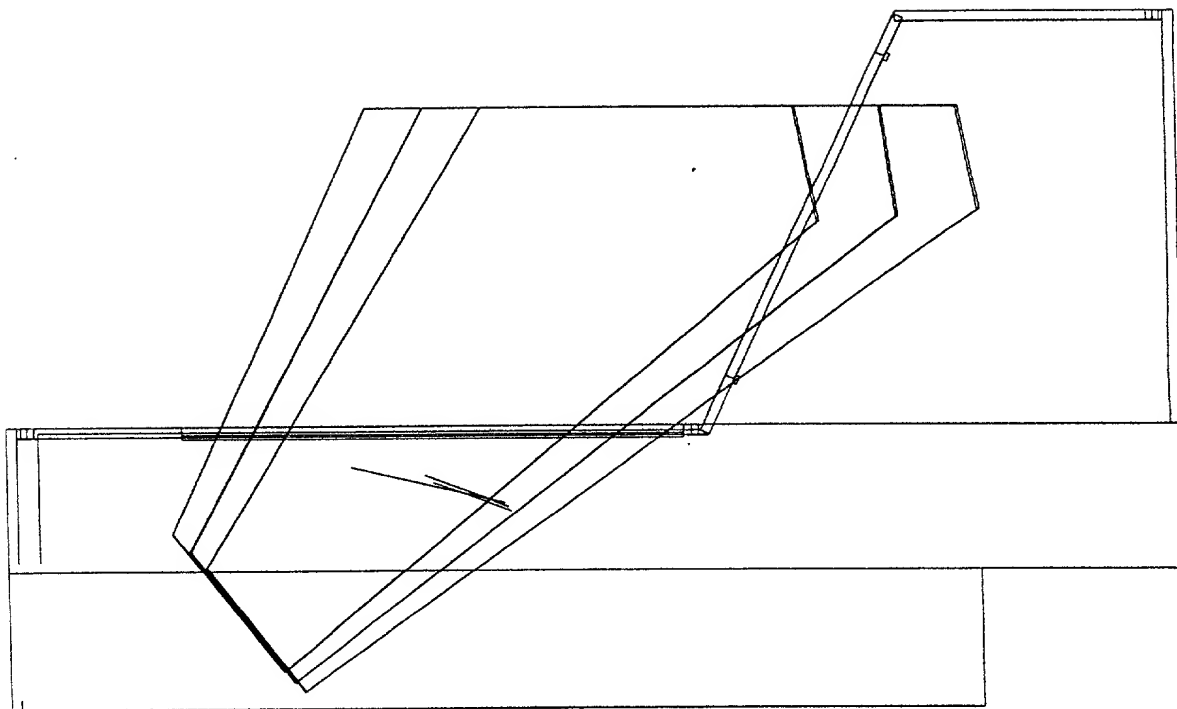


FIG. 5B2

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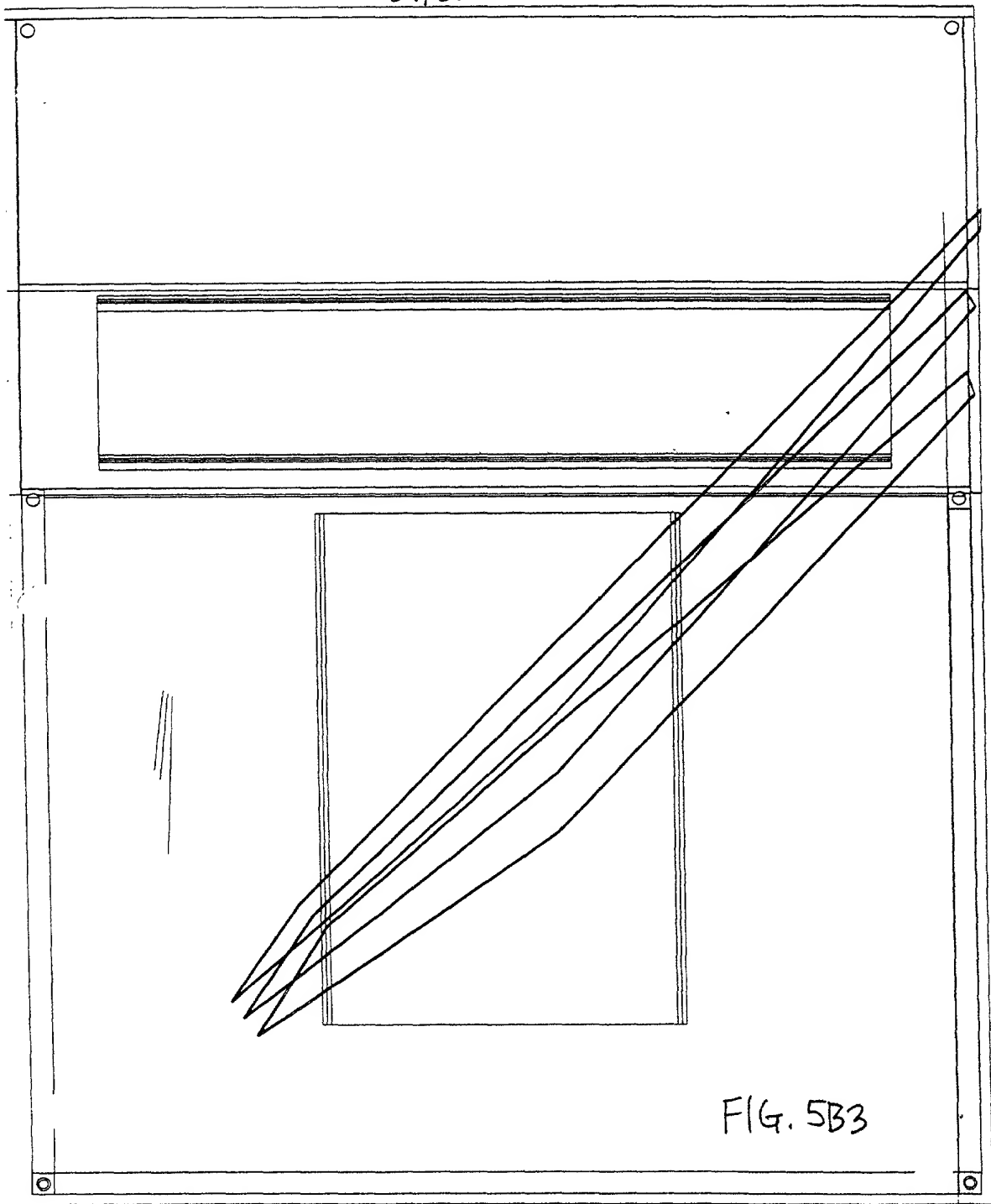


FIG. 5B3

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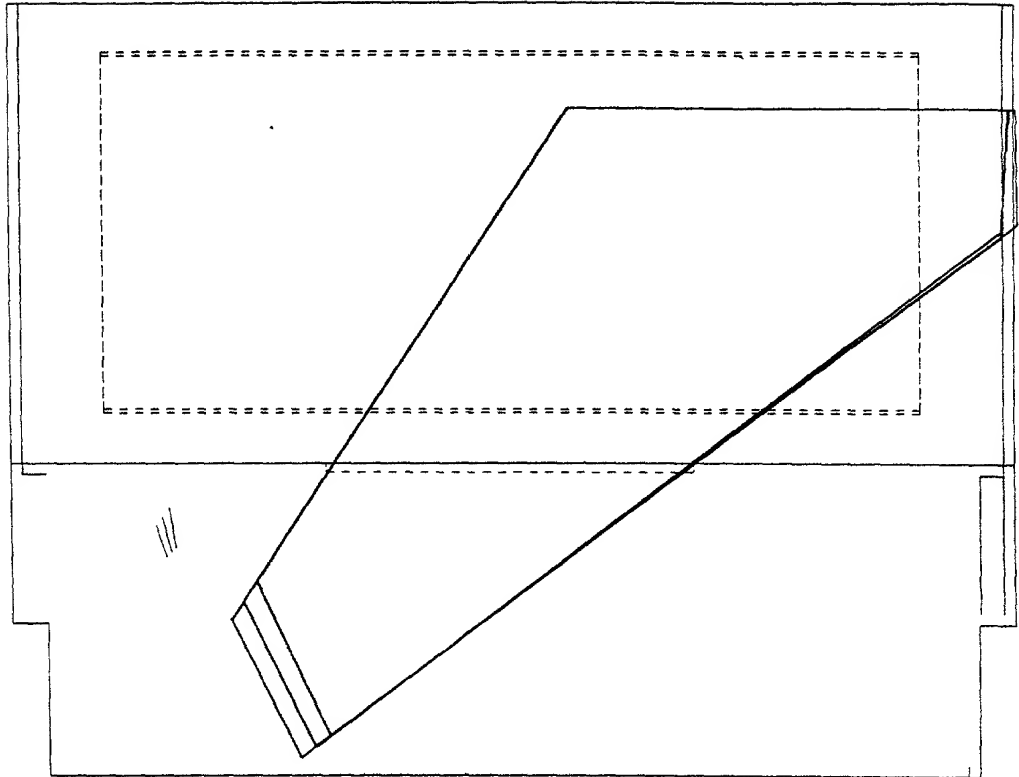


FIG. 5B4

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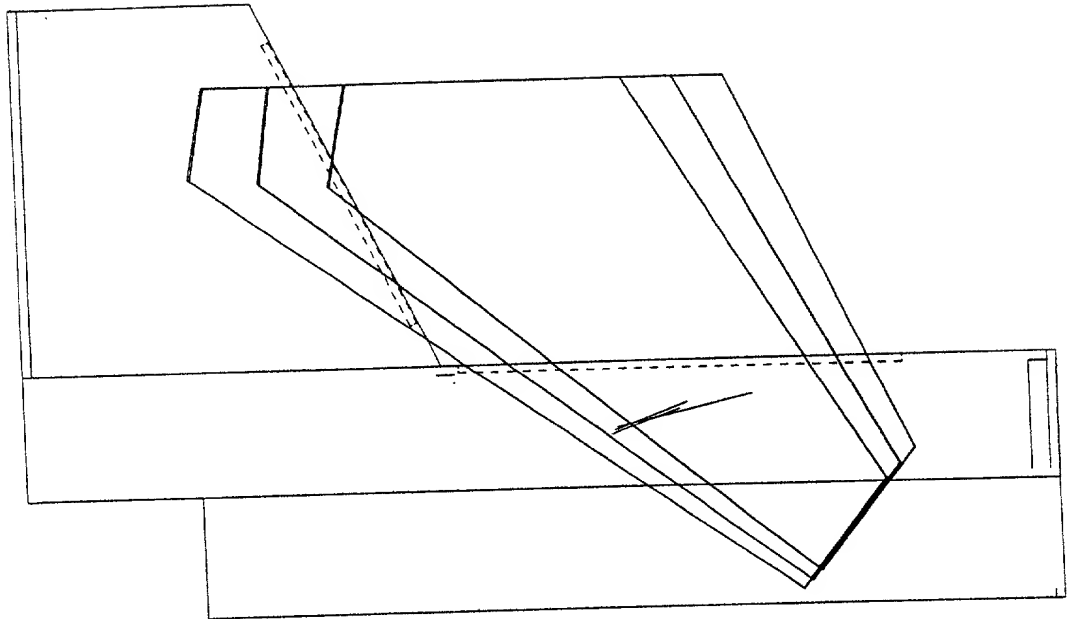


FIG. 5B5

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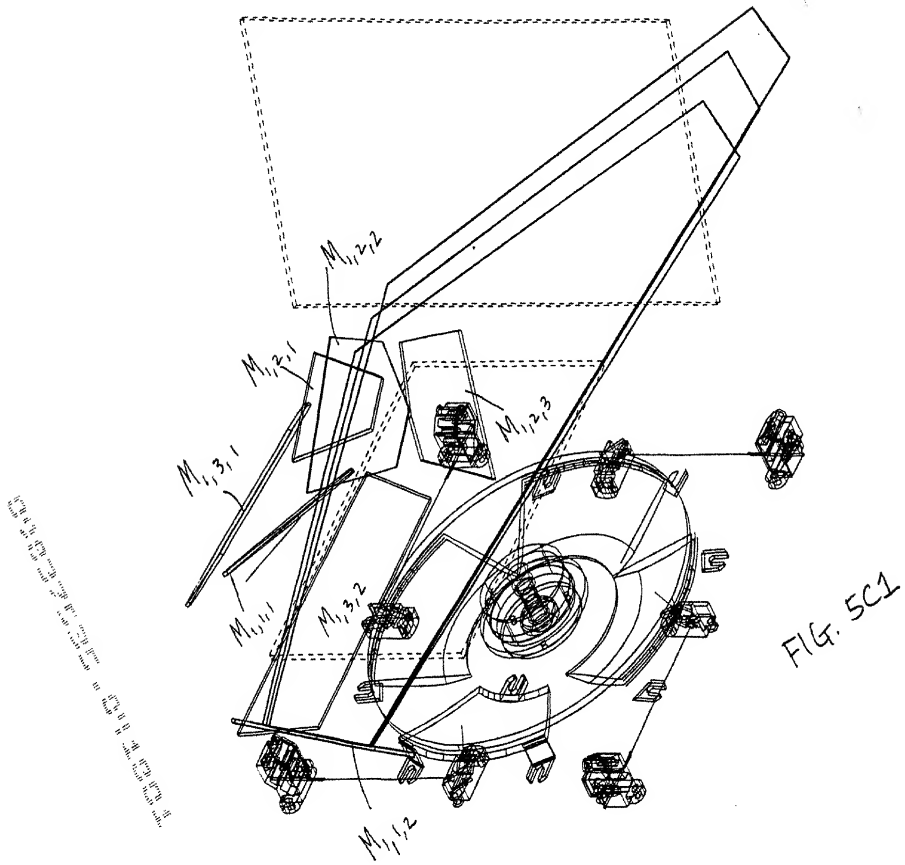
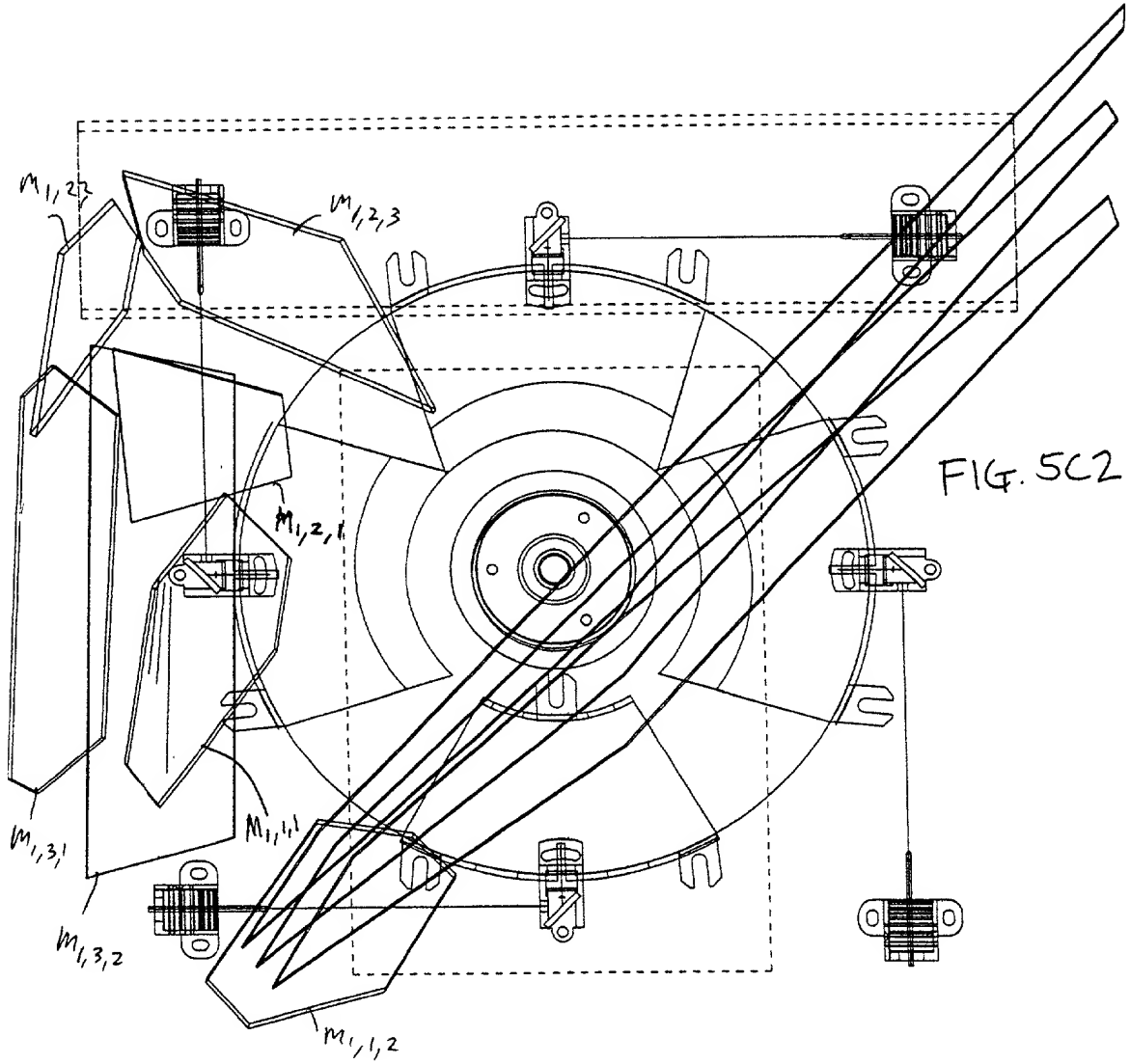


FIG. 5C1

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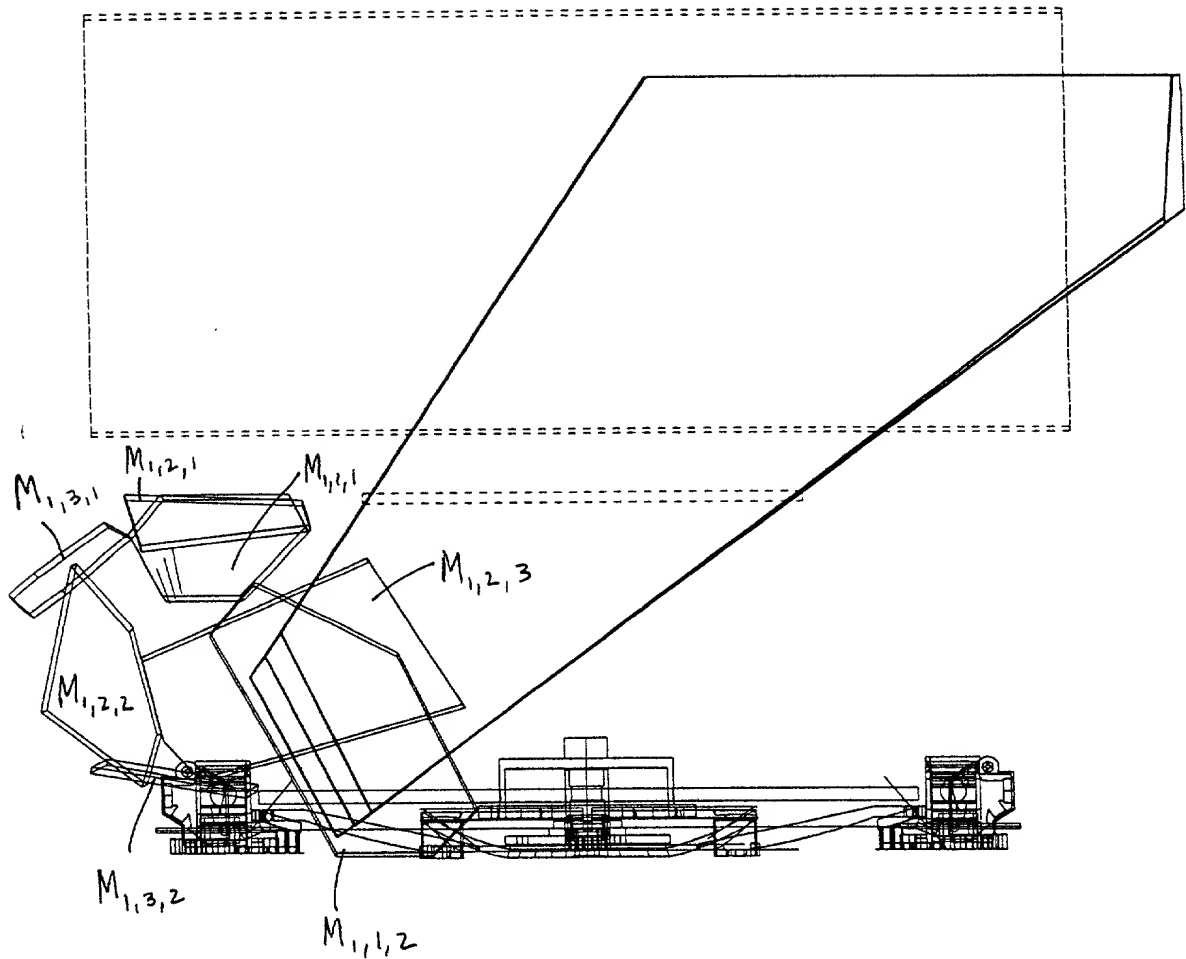


FIG. 5C3

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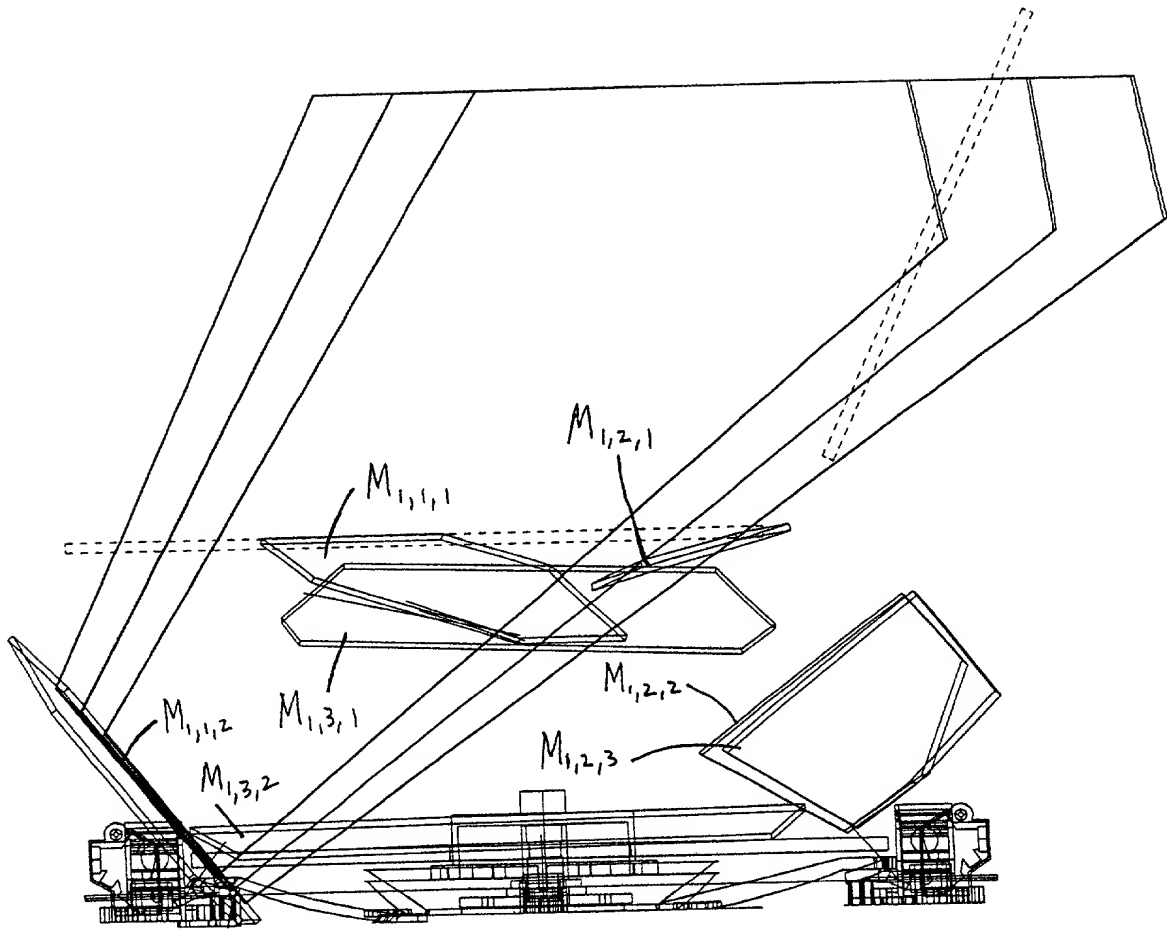


FIG. 5C4

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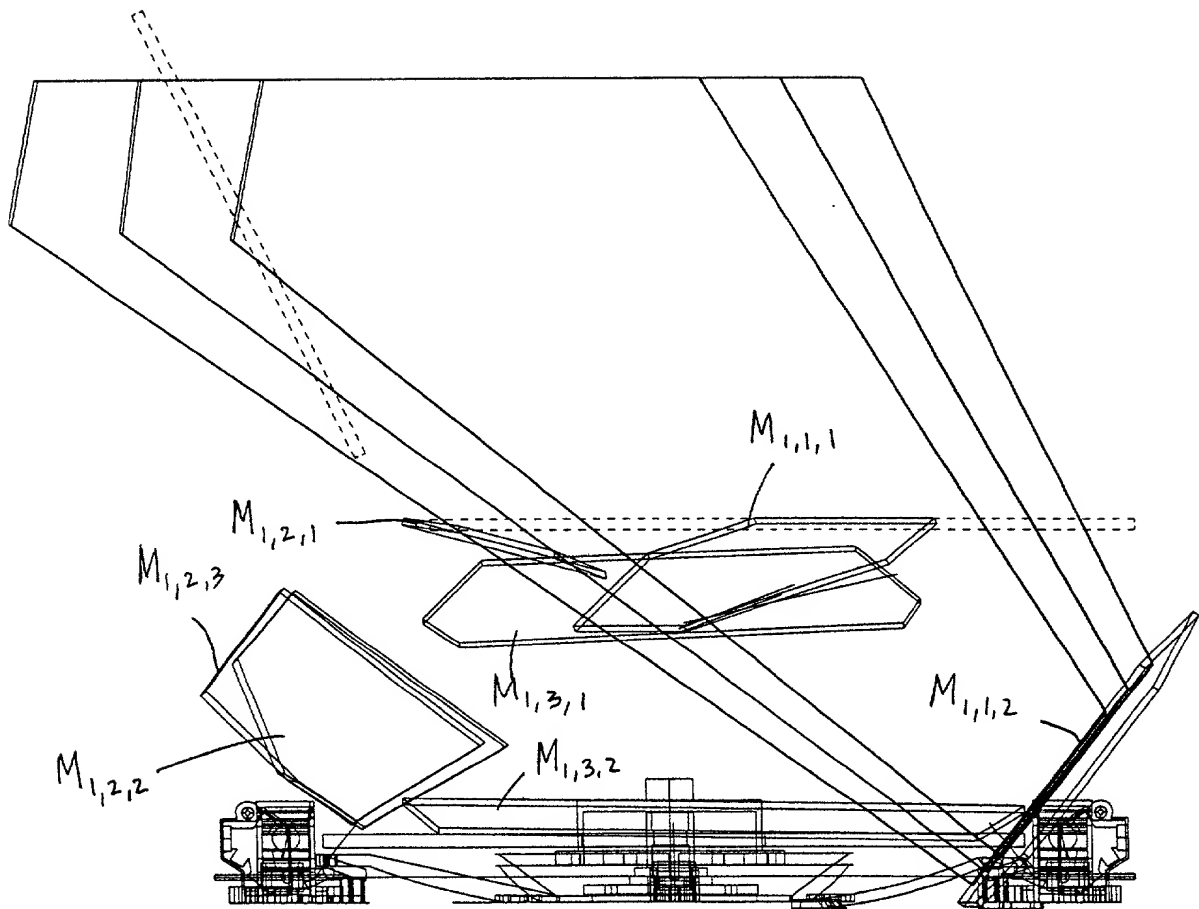


FIG. 5C5

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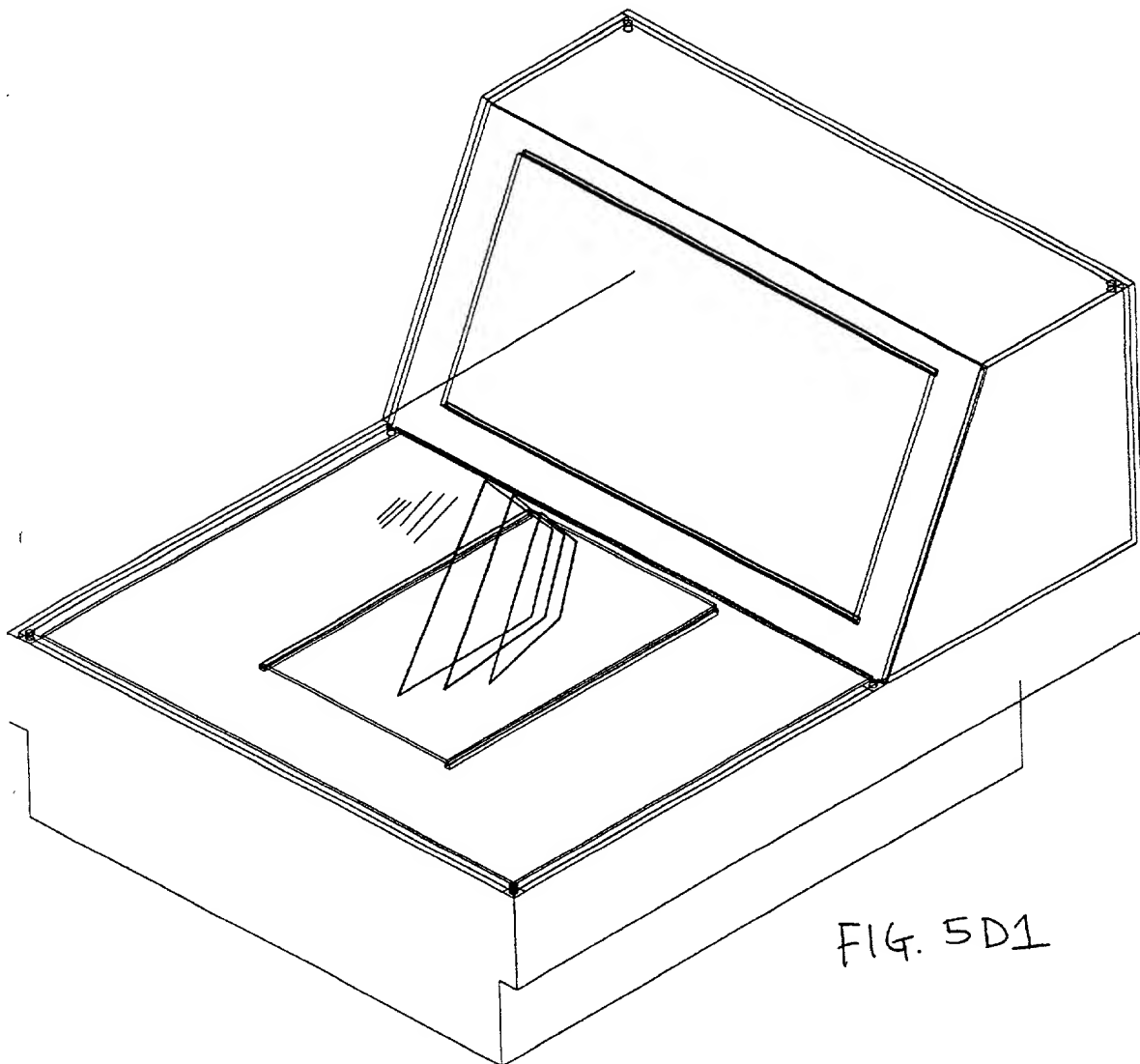


FIG. 5D1

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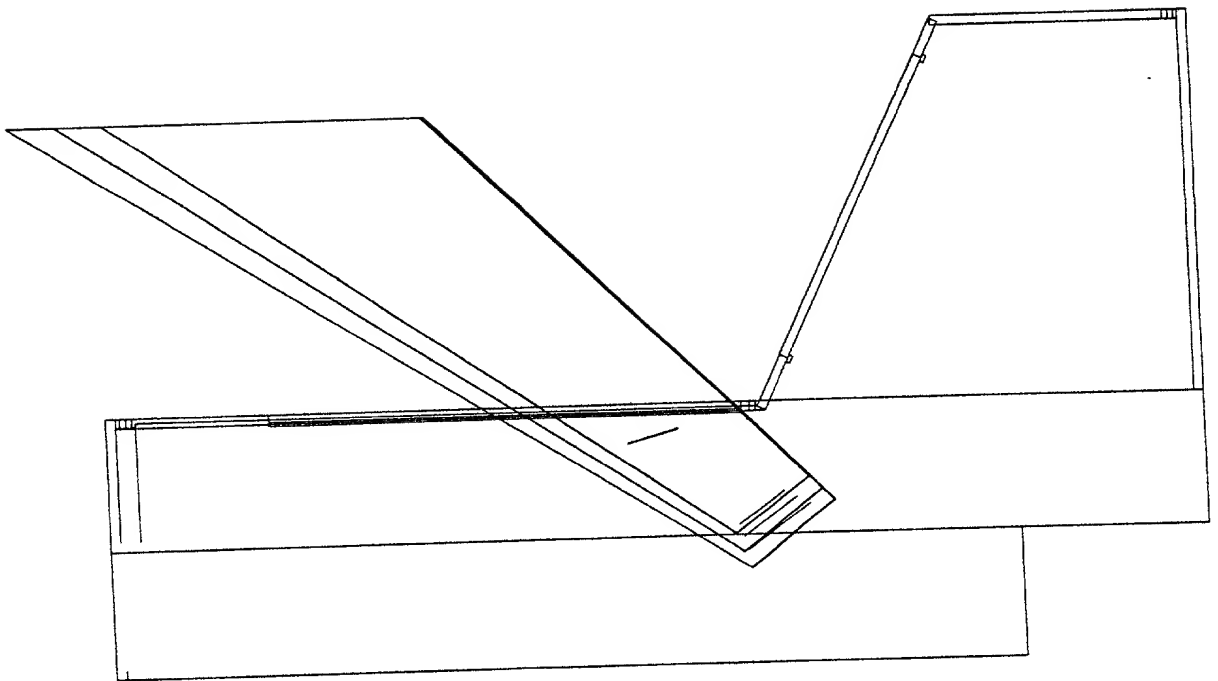


FIG. 5D2

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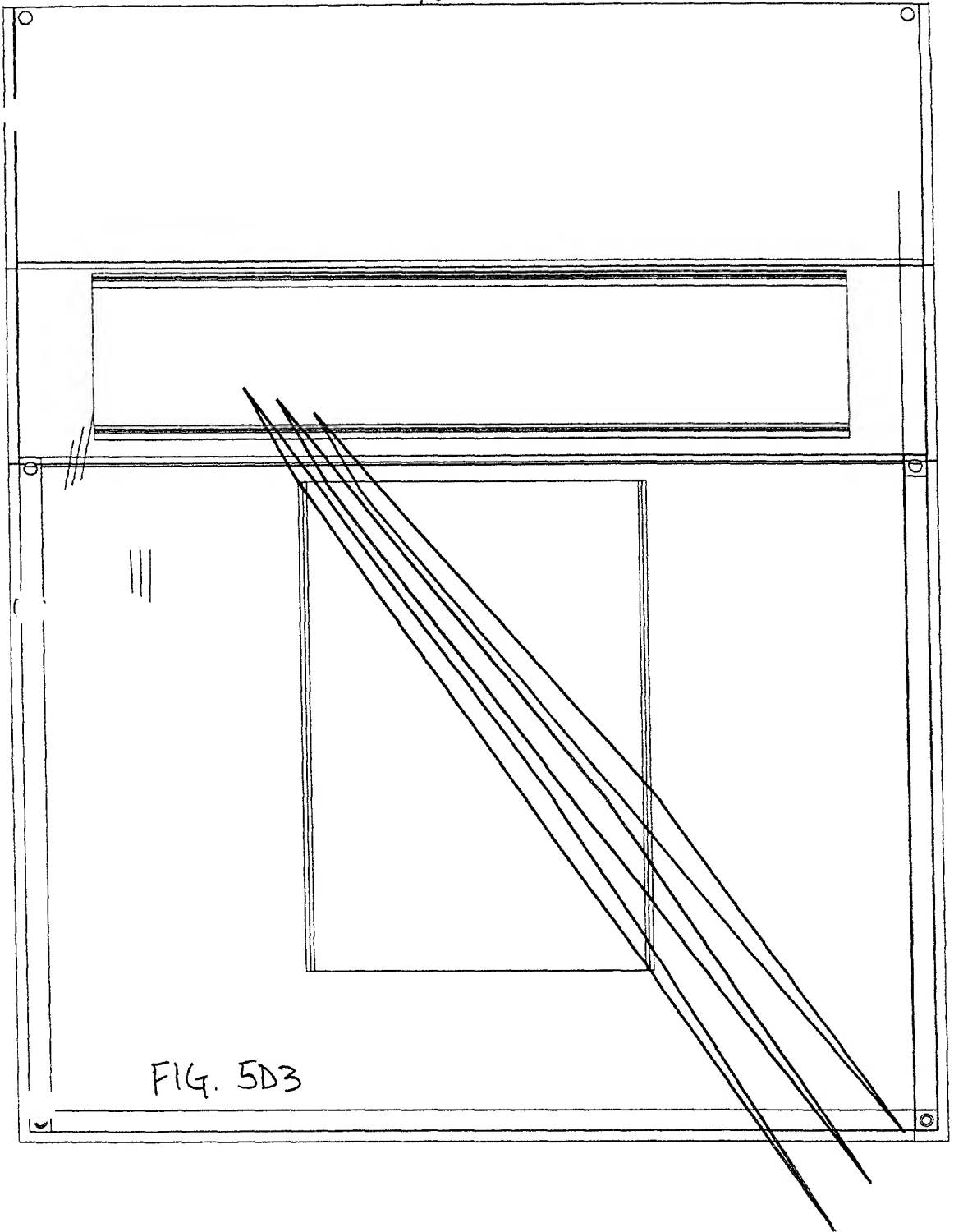


FIG. 5D3

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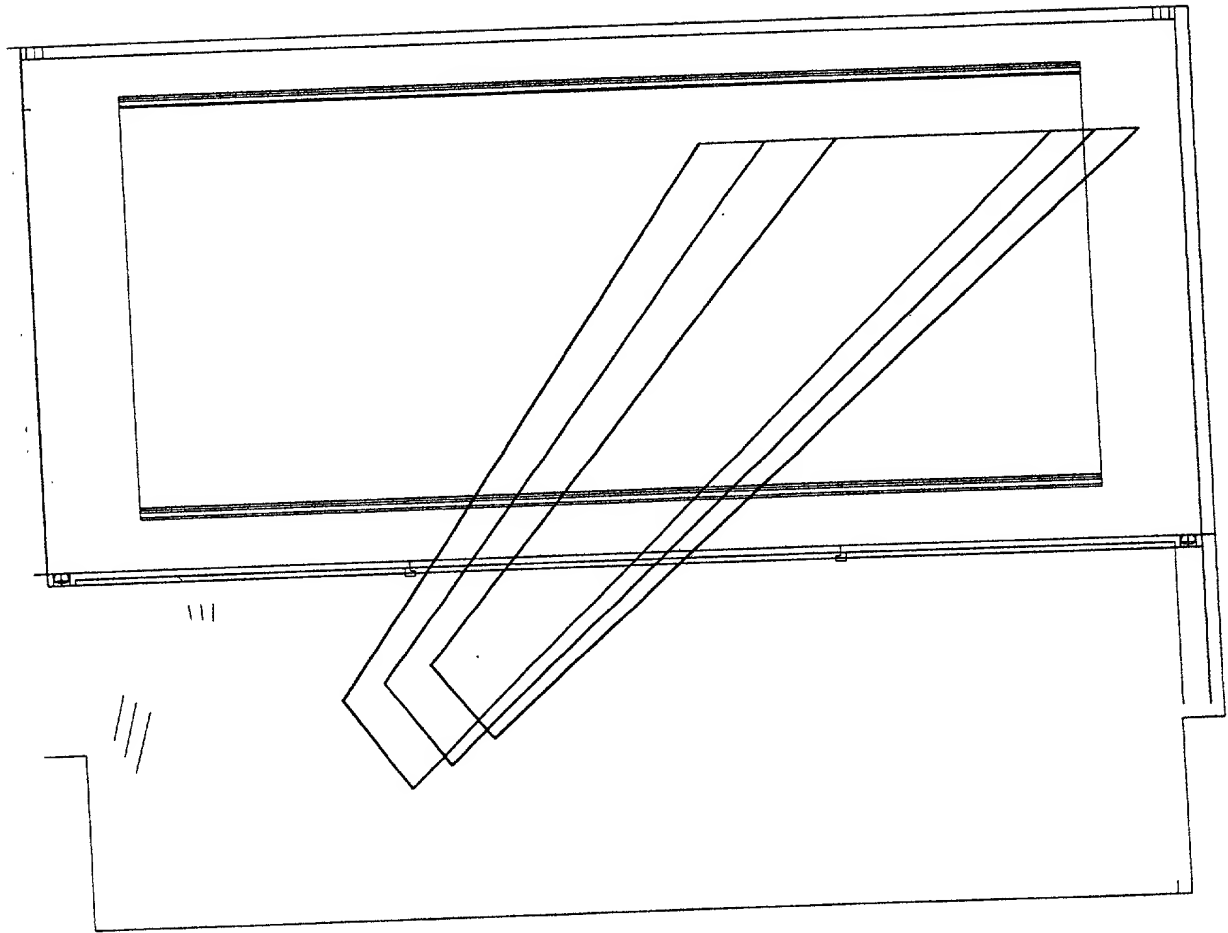


FIG. 5D4

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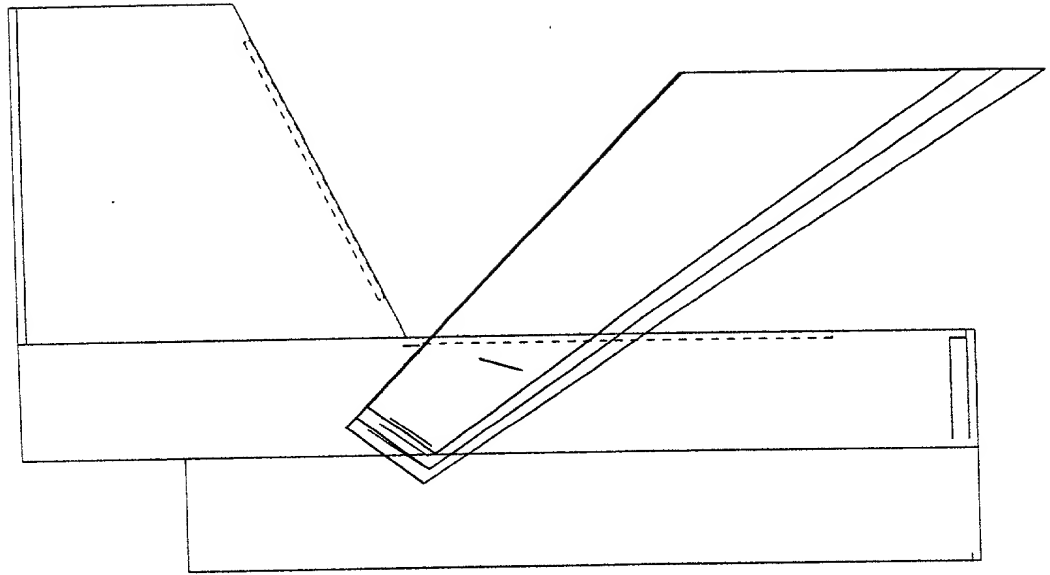


FIG. 5D5

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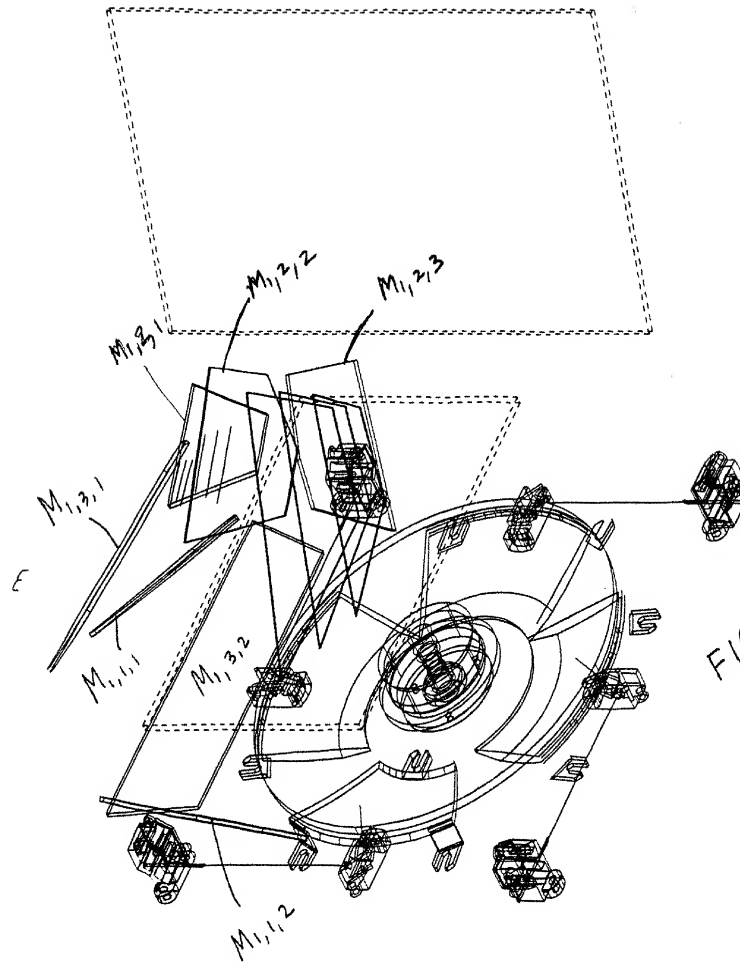


FIG. 5E1

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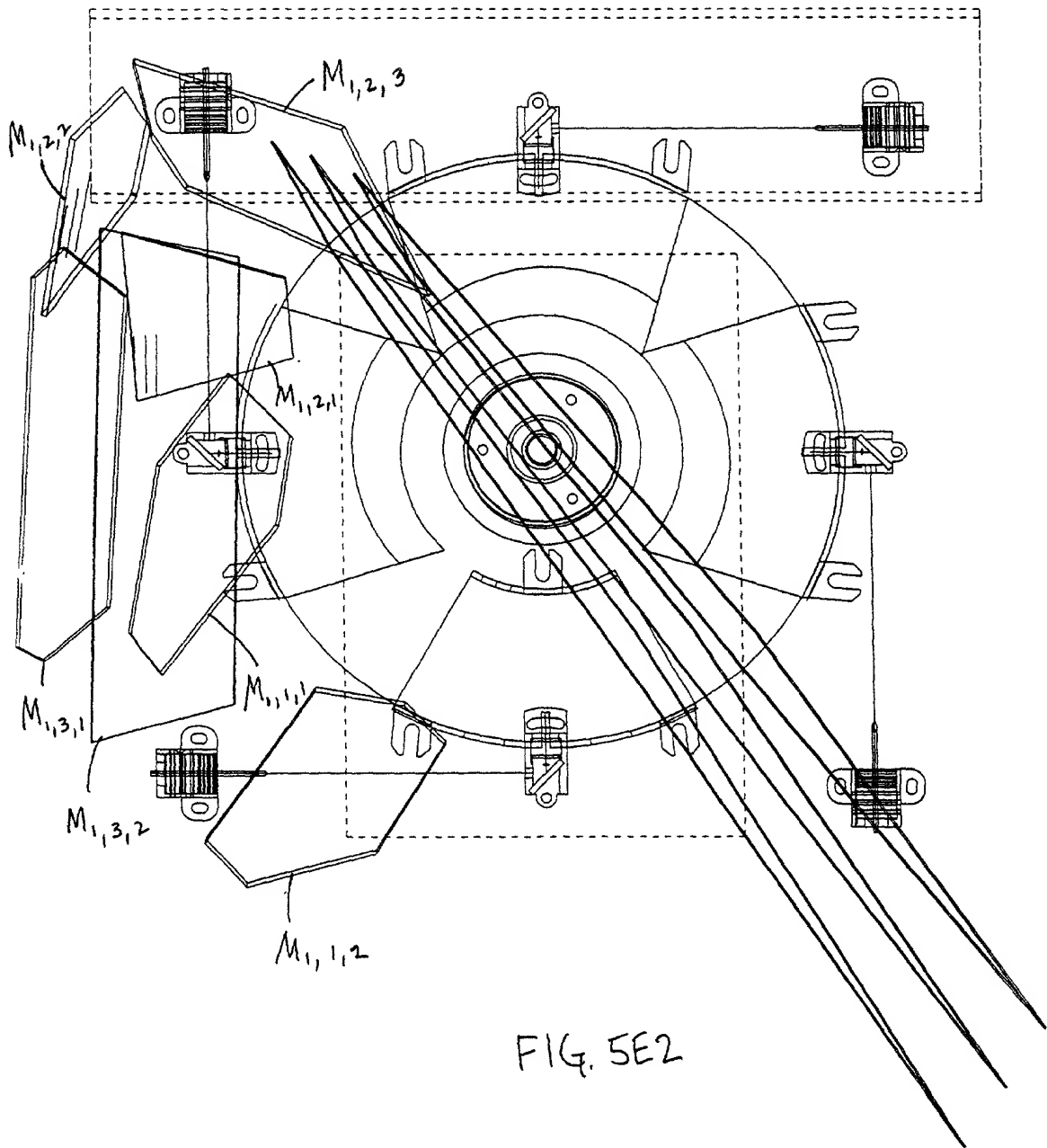
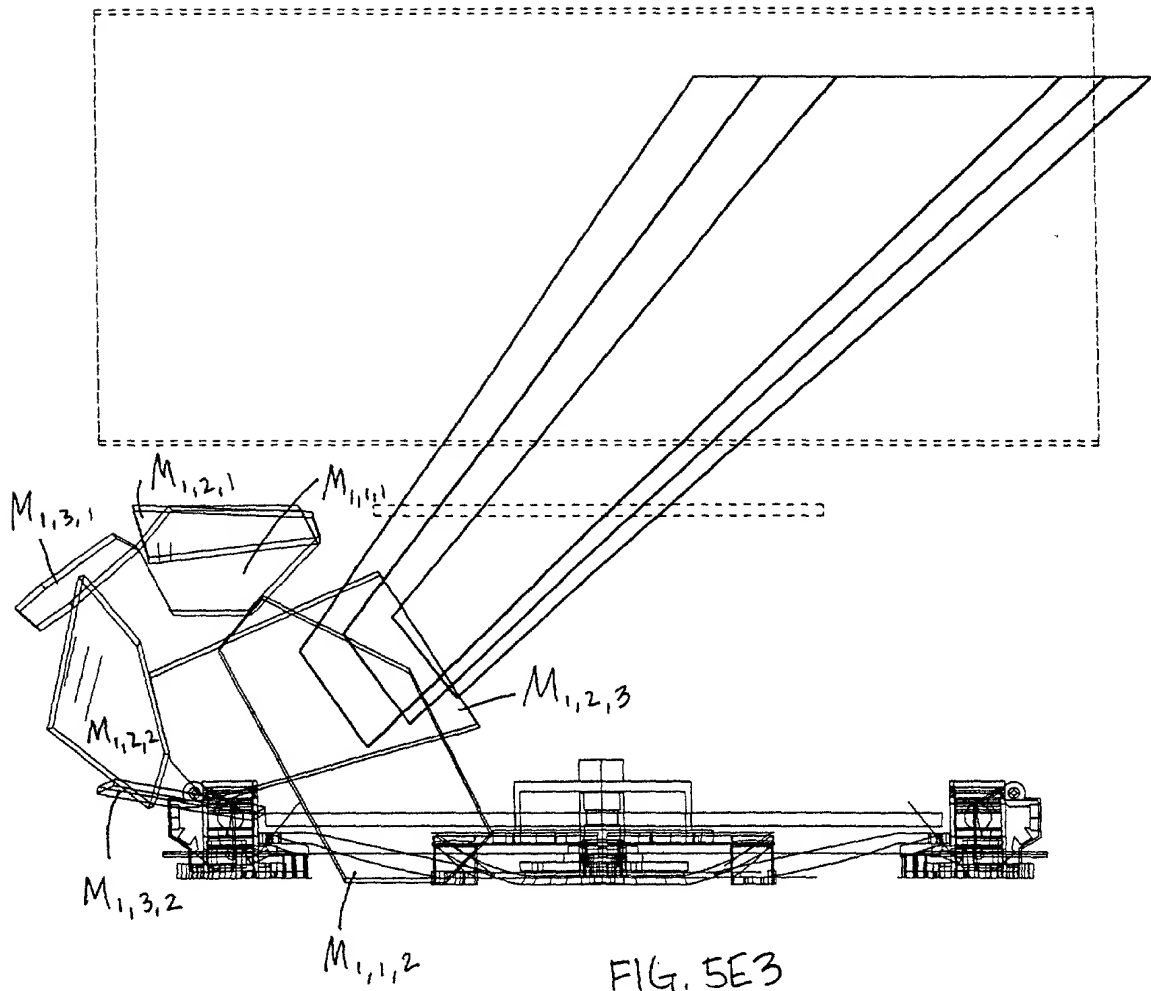


FIG. 5E2

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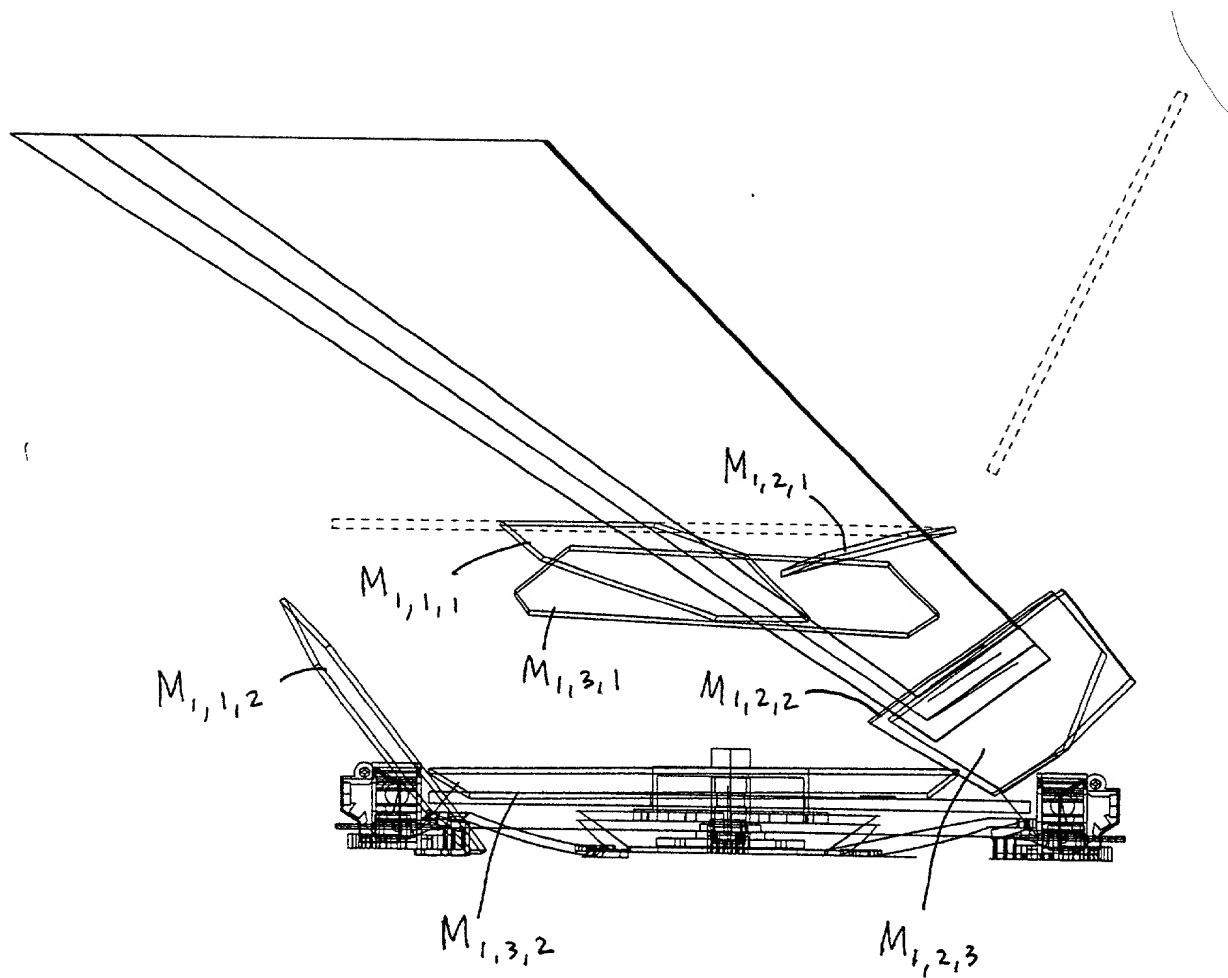


FIG. 5E4

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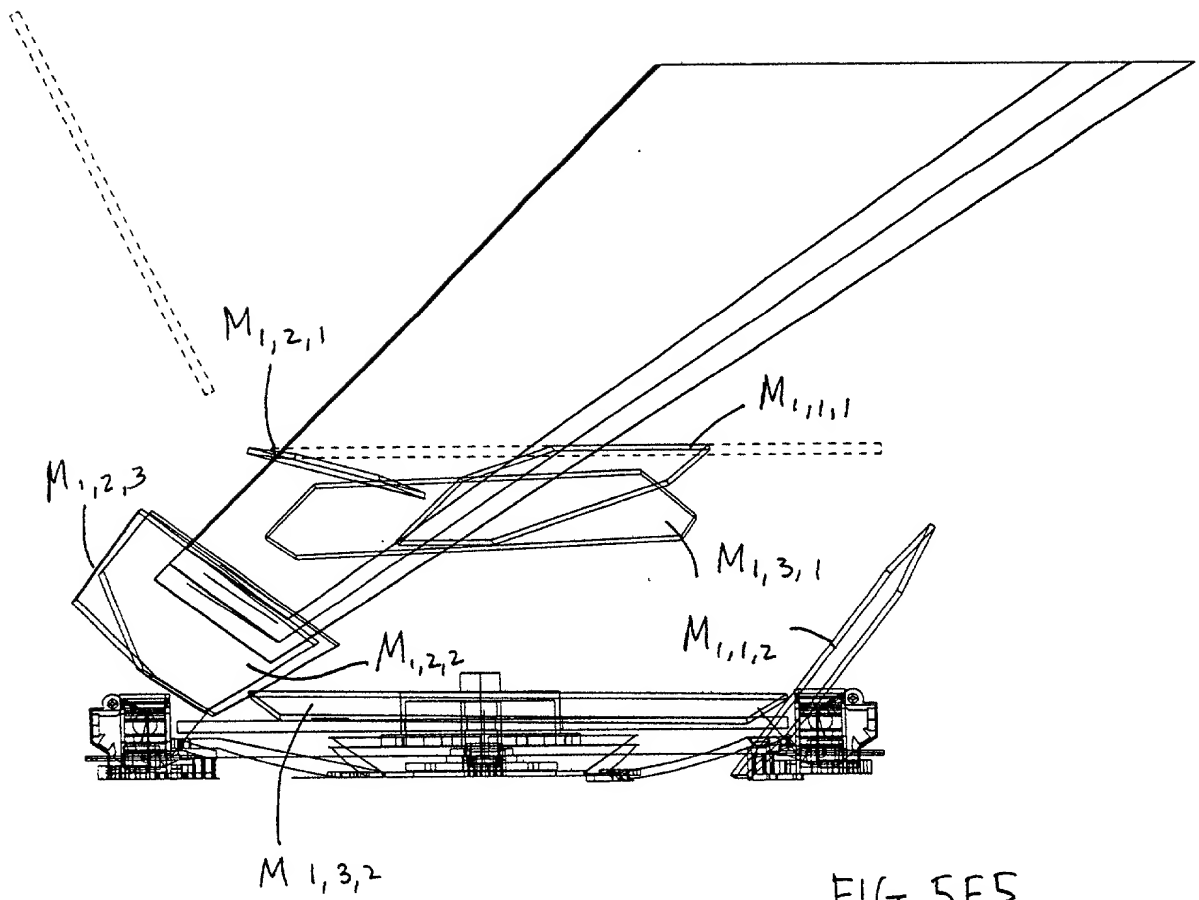


FIG. 5E5

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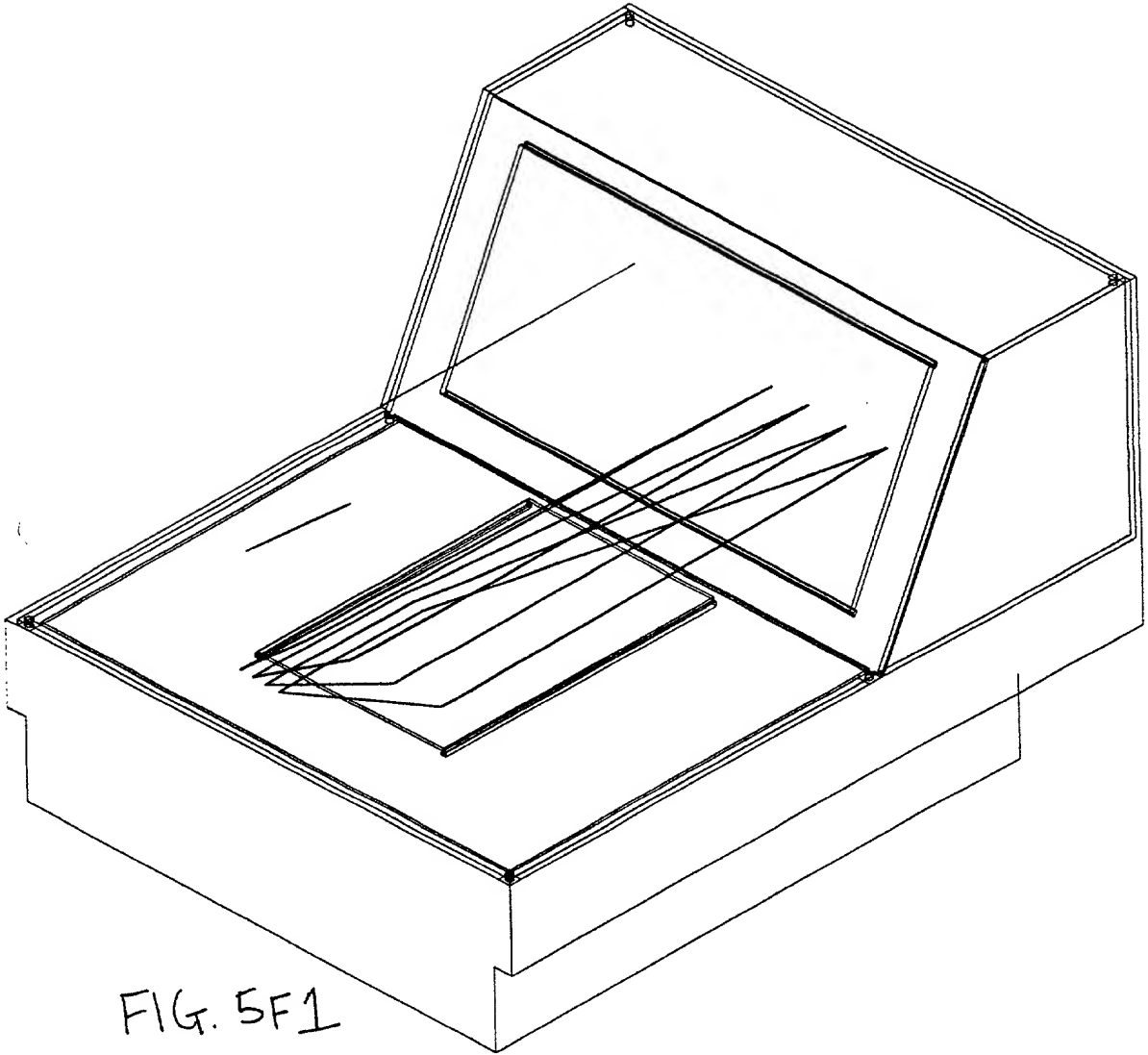


FIG. 5F1

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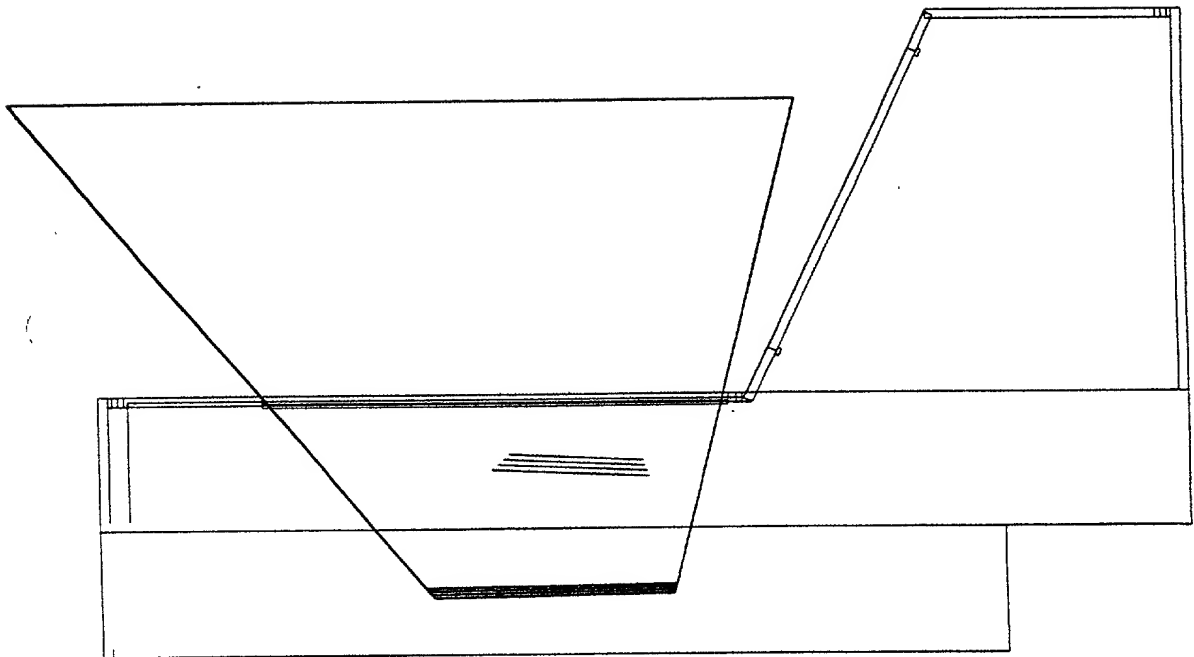


FIG. 5F2

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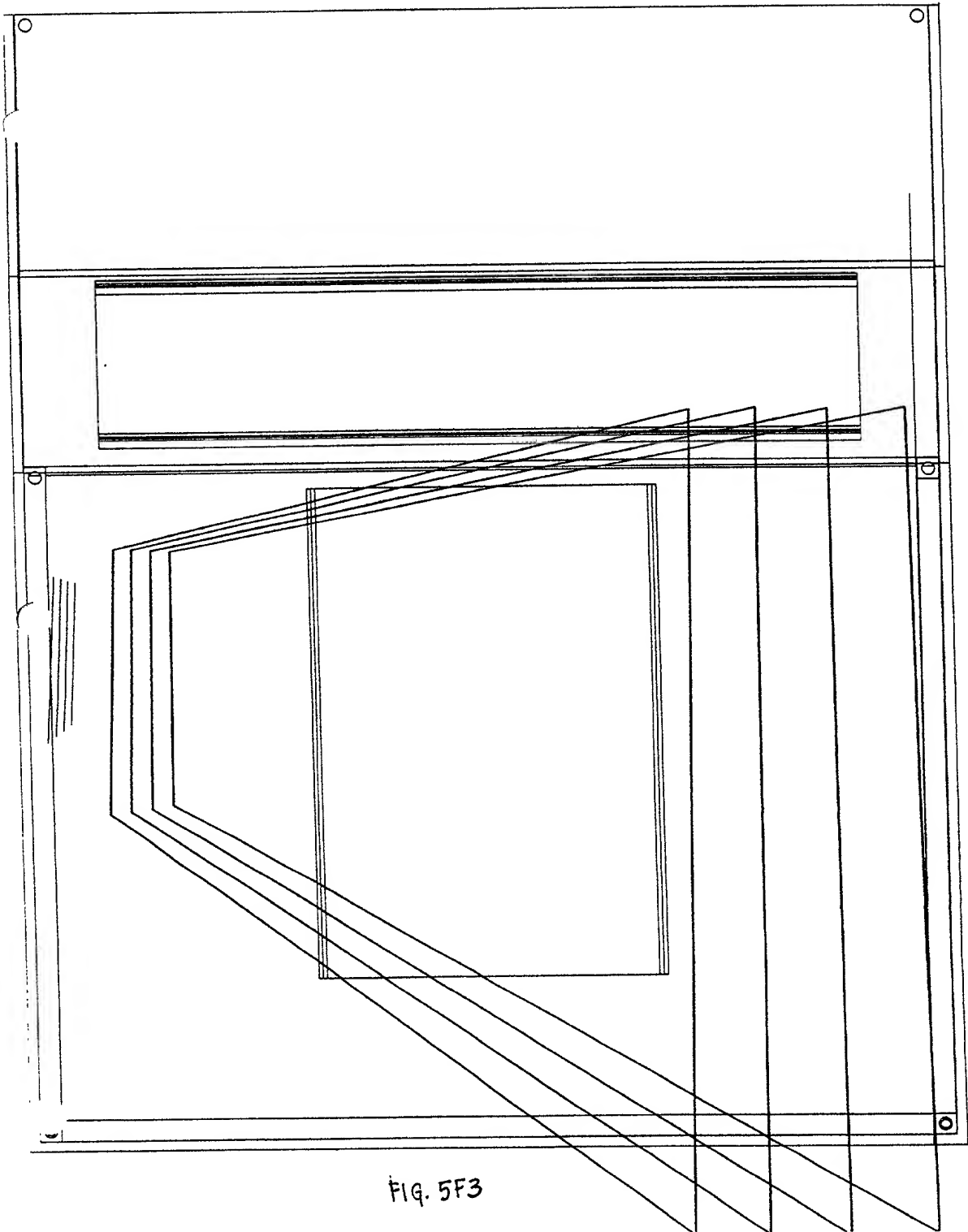


FIG. 5F3

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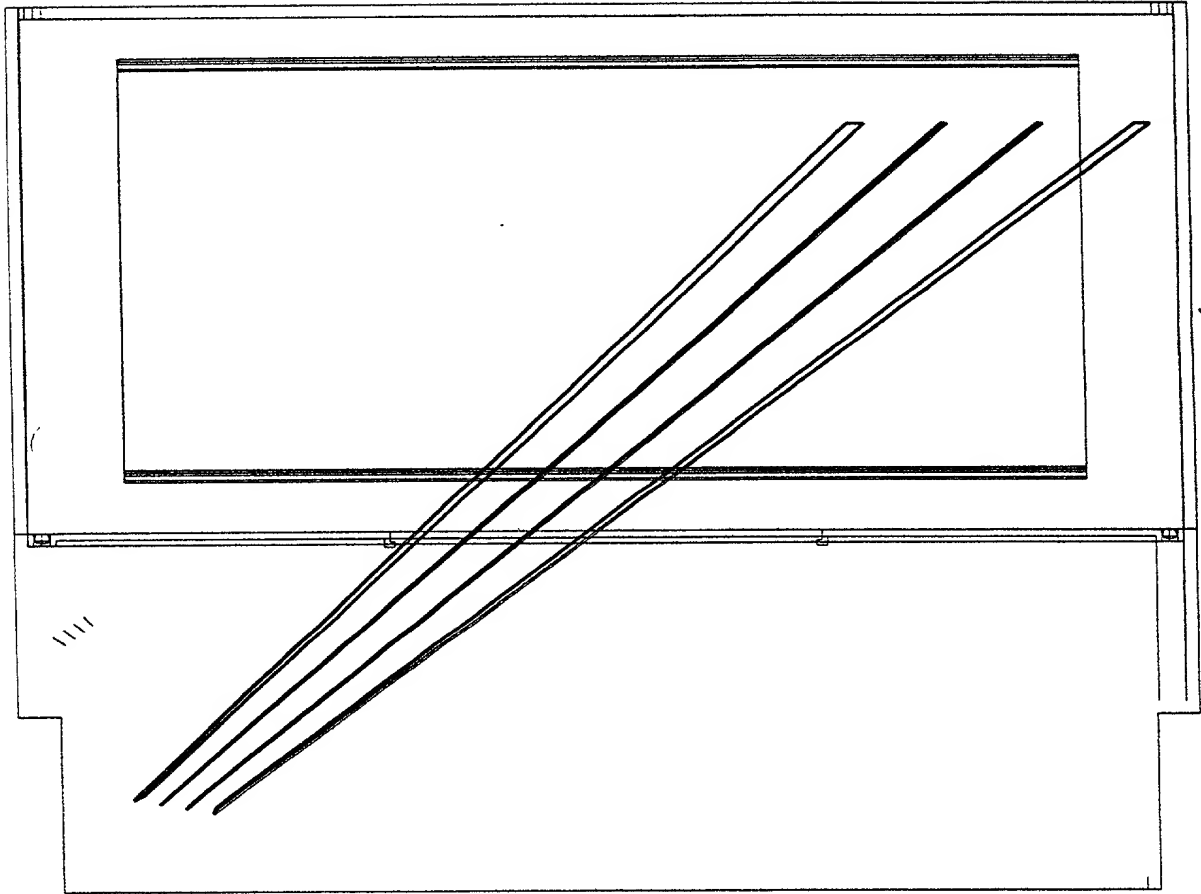


FIG. 5F4

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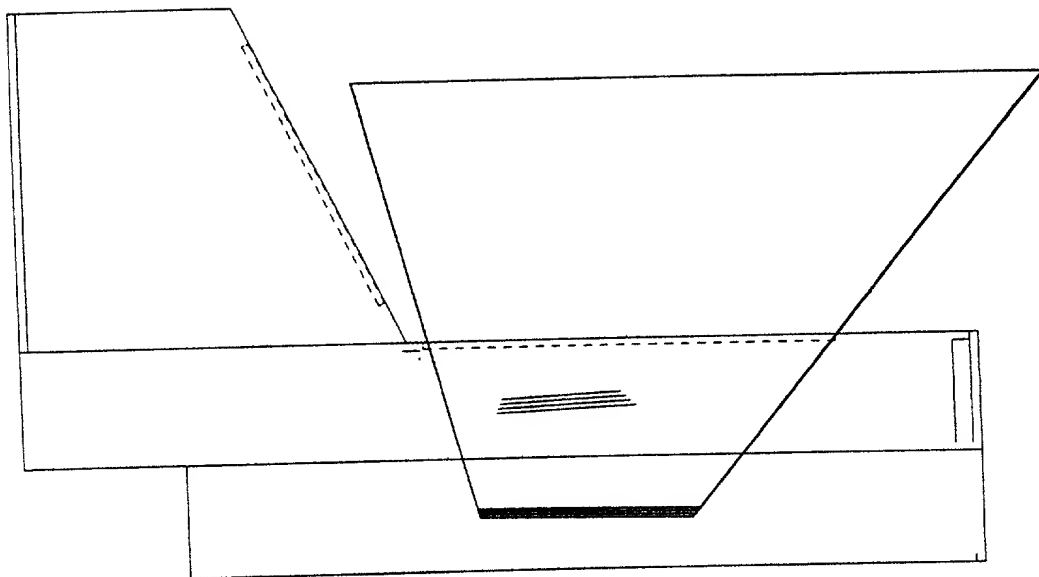
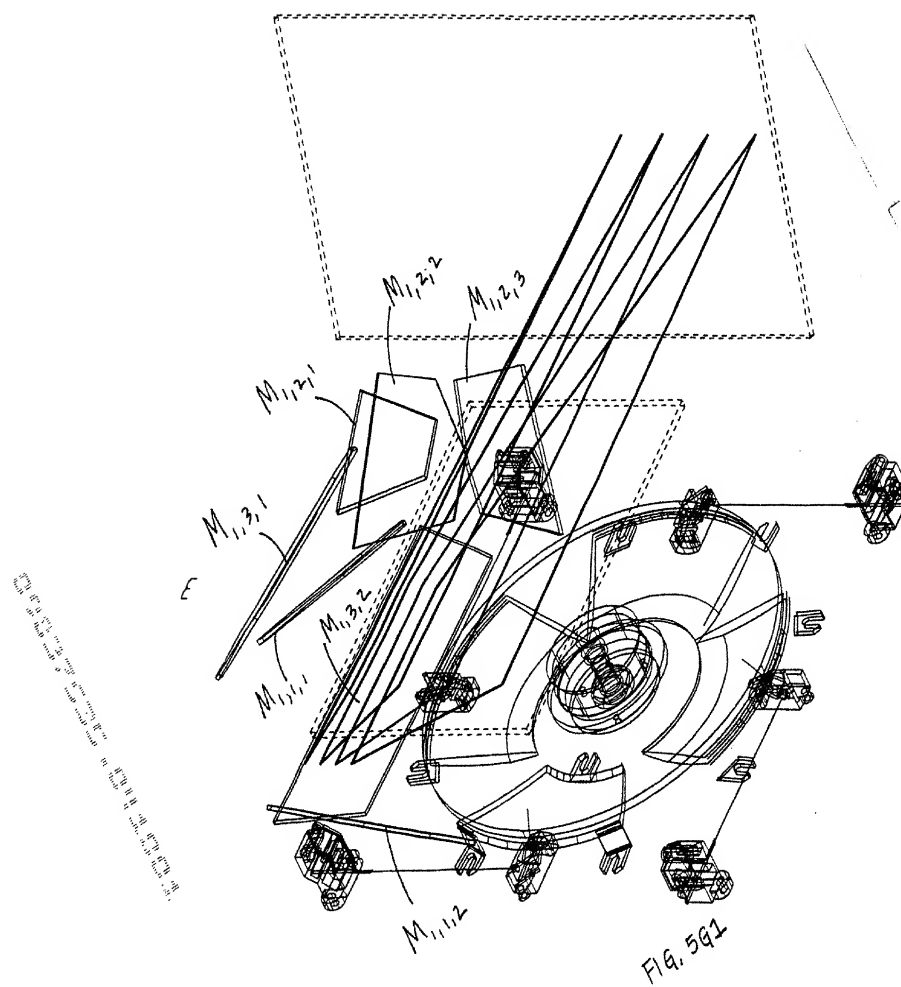


FIG. 5F5

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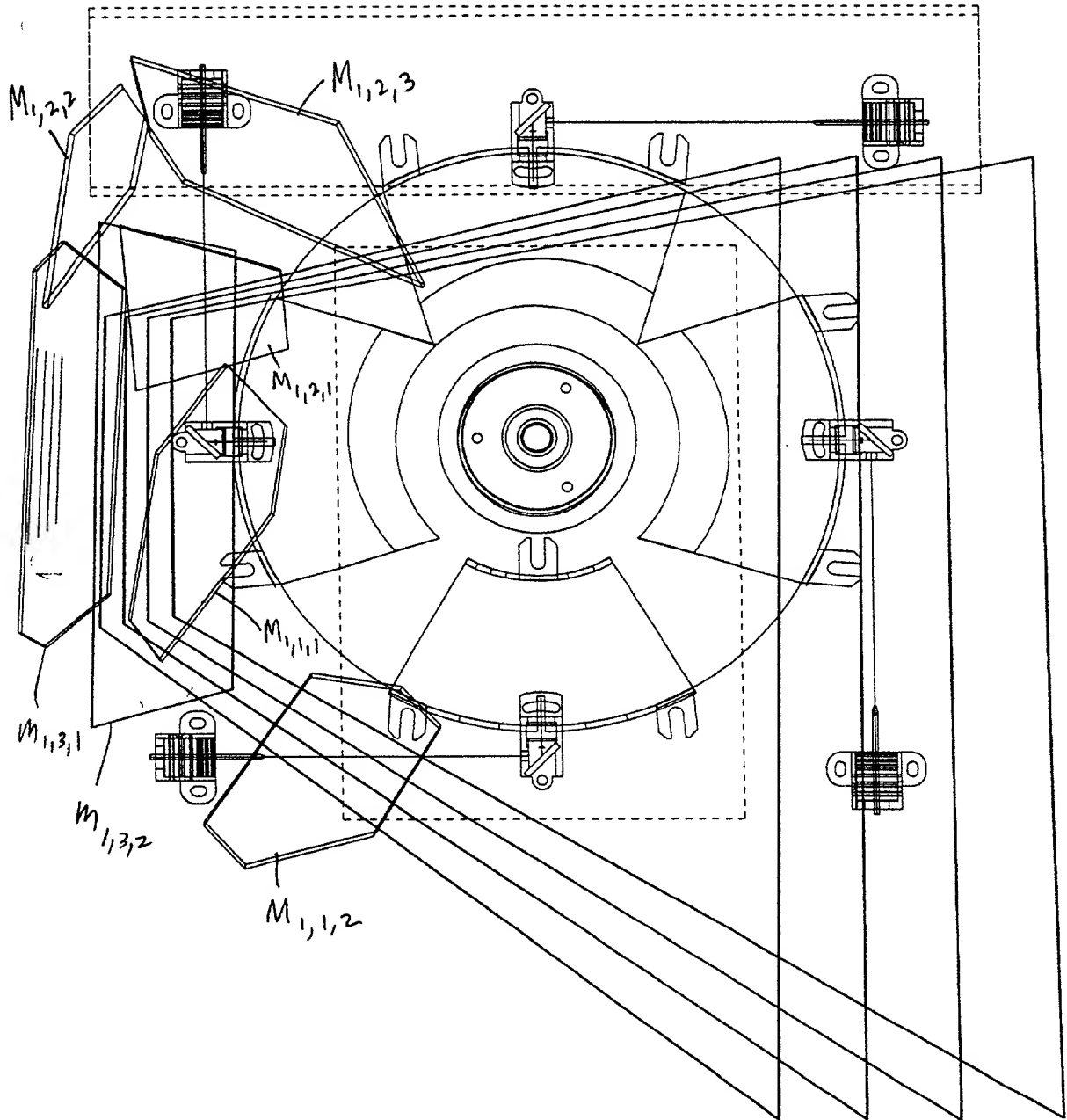


FIG. 592

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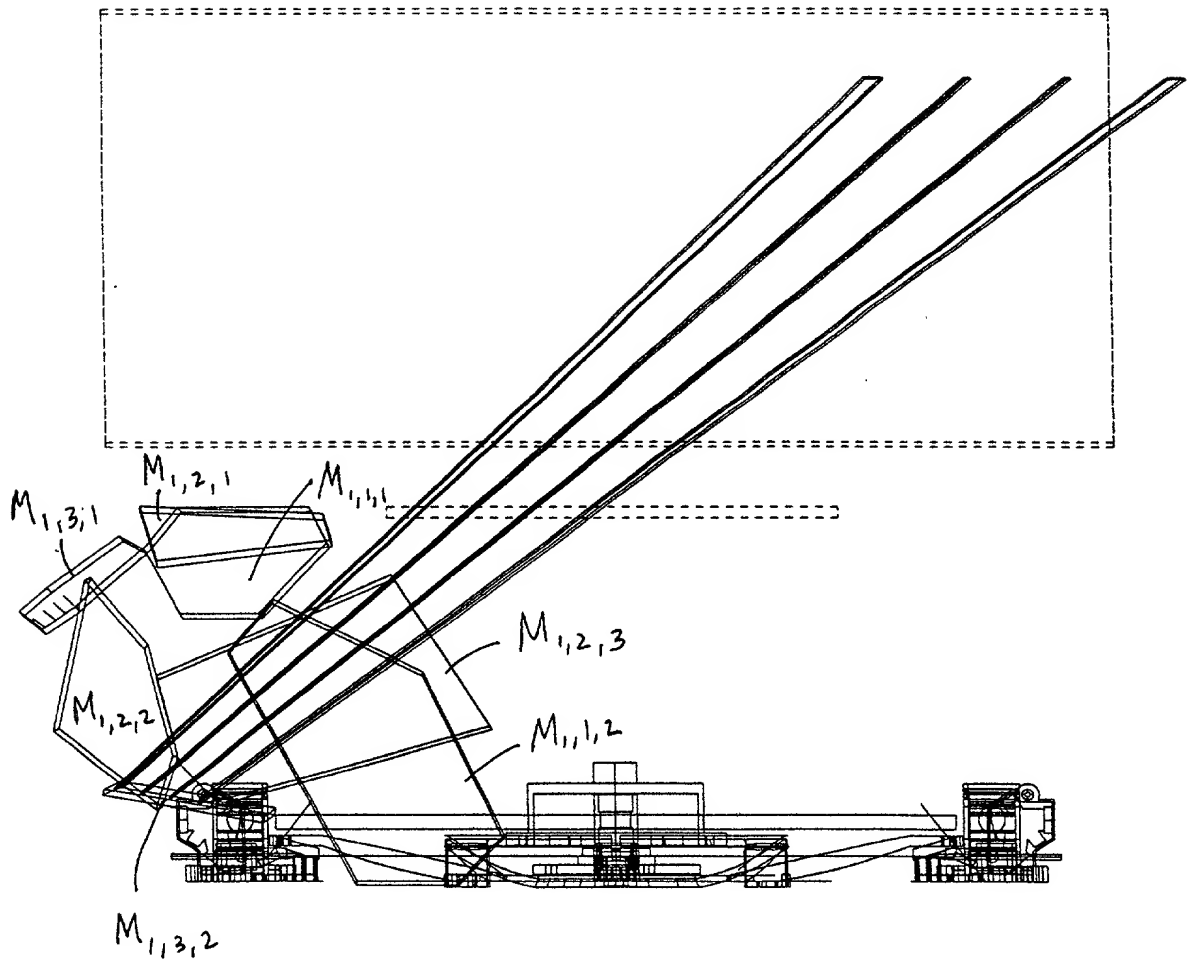


FIG 5G3

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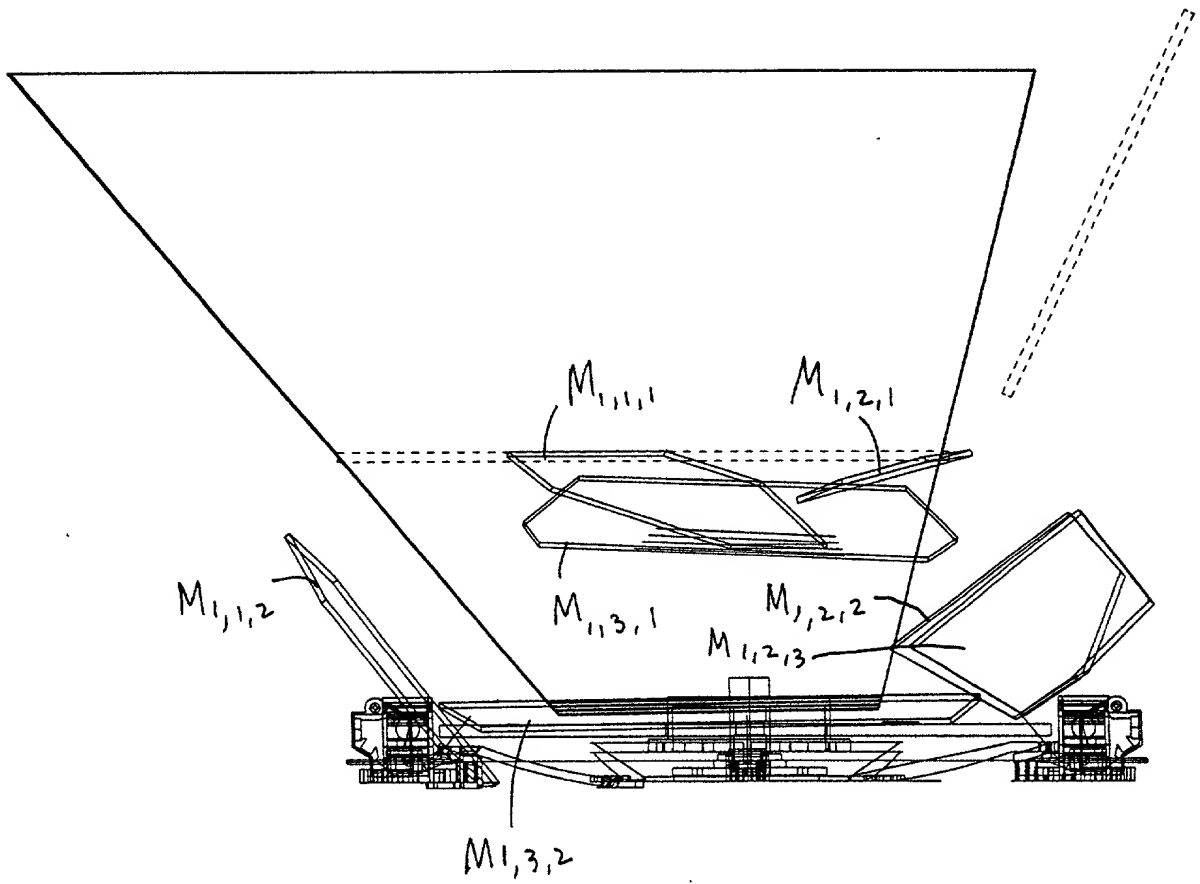


FIG. 5G4

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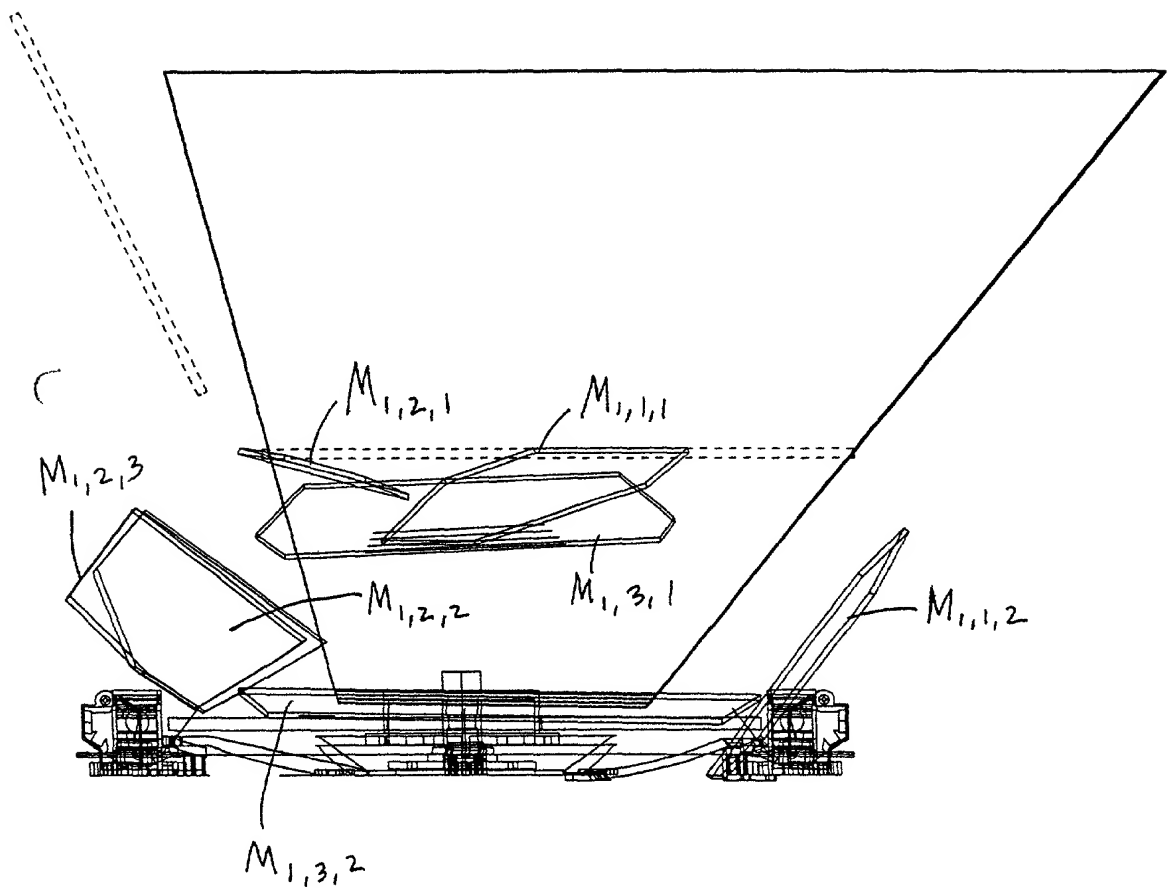
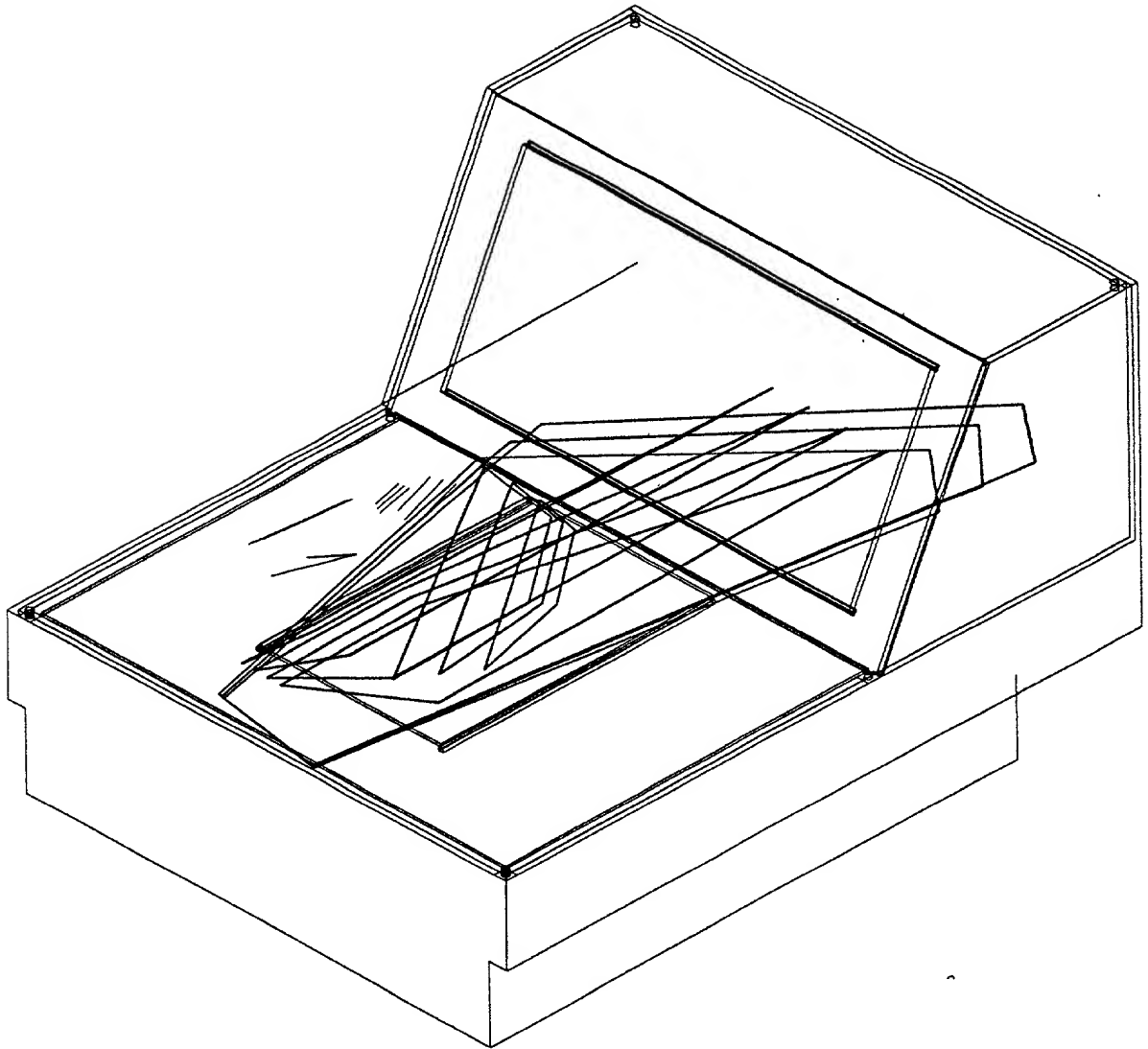


FIG. 565

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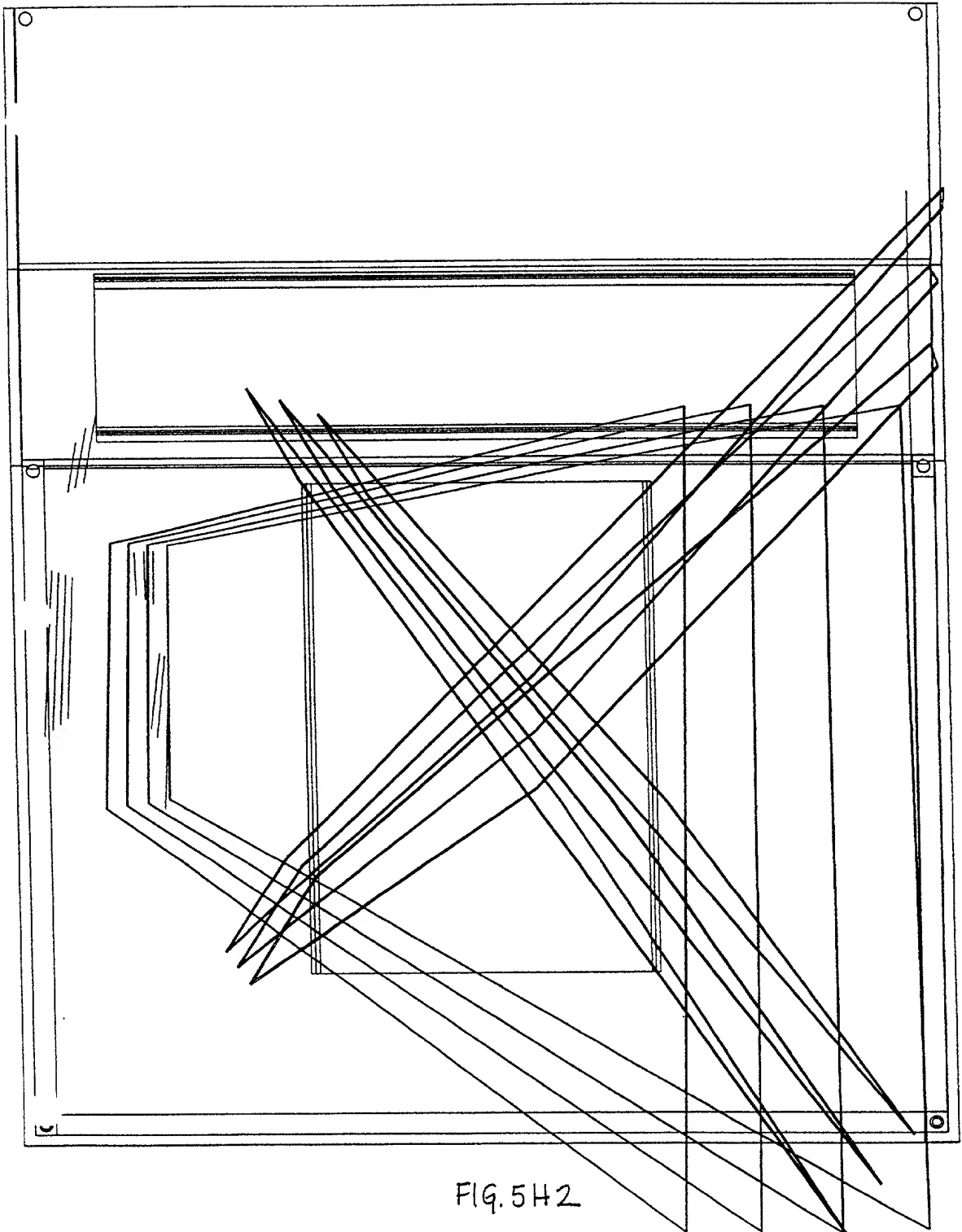


FIG. 5H2

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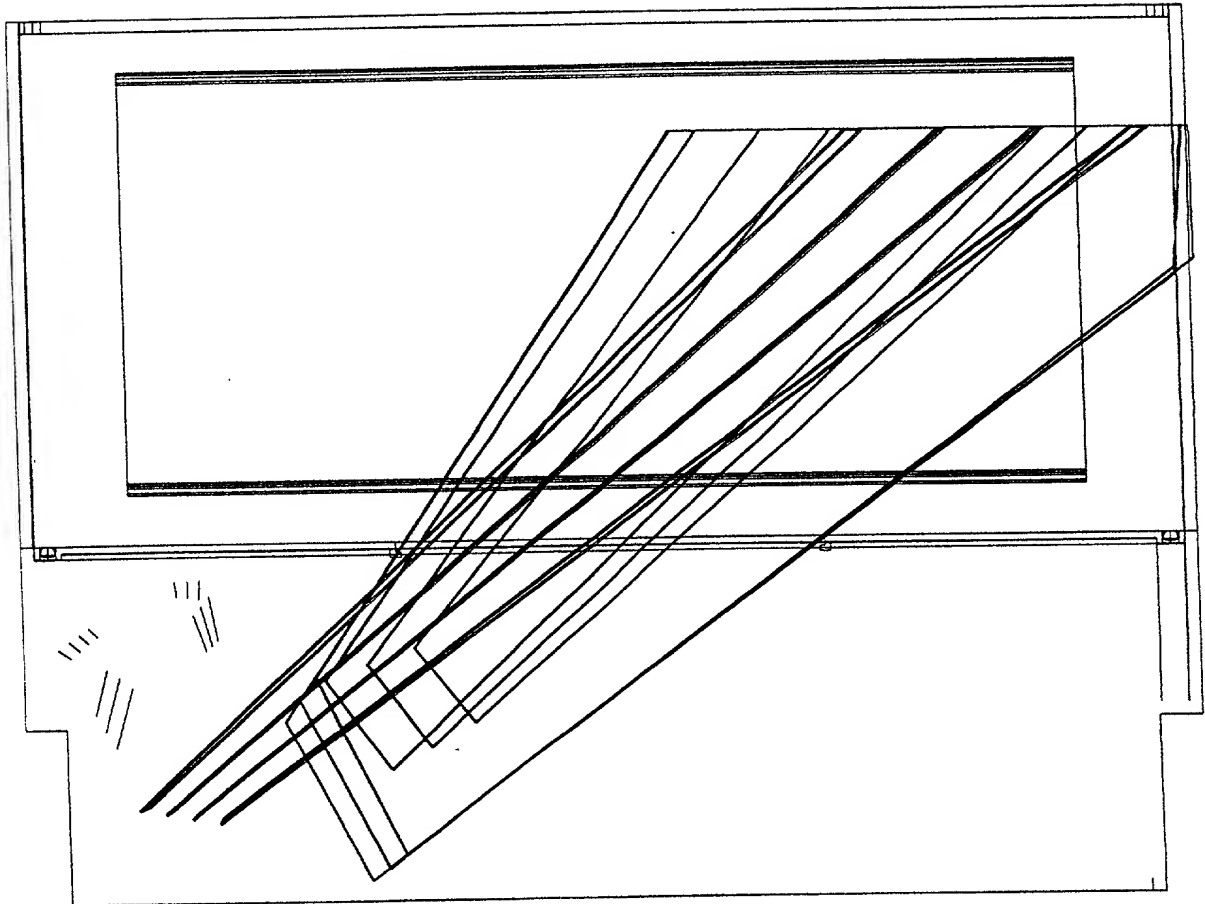


FIG. 543

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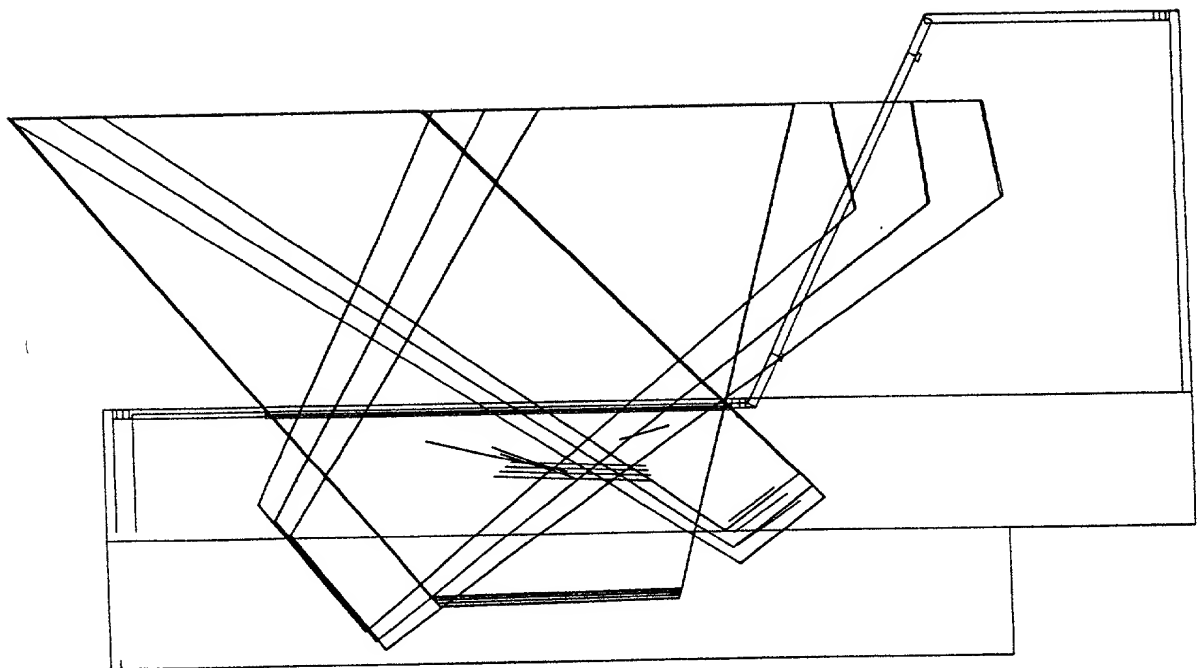


FIG. 5H4

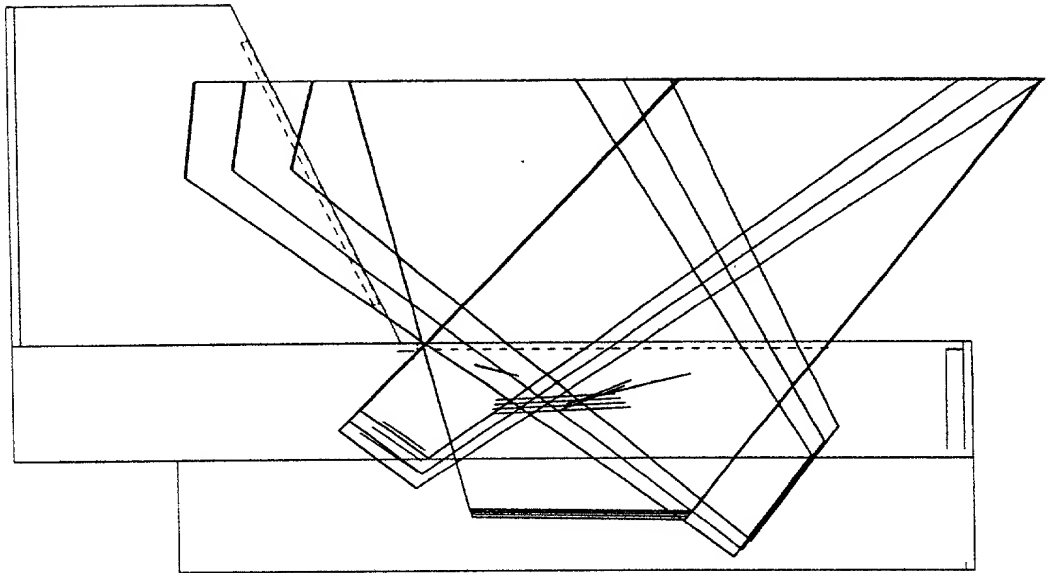
[illegible]

FIG. 545

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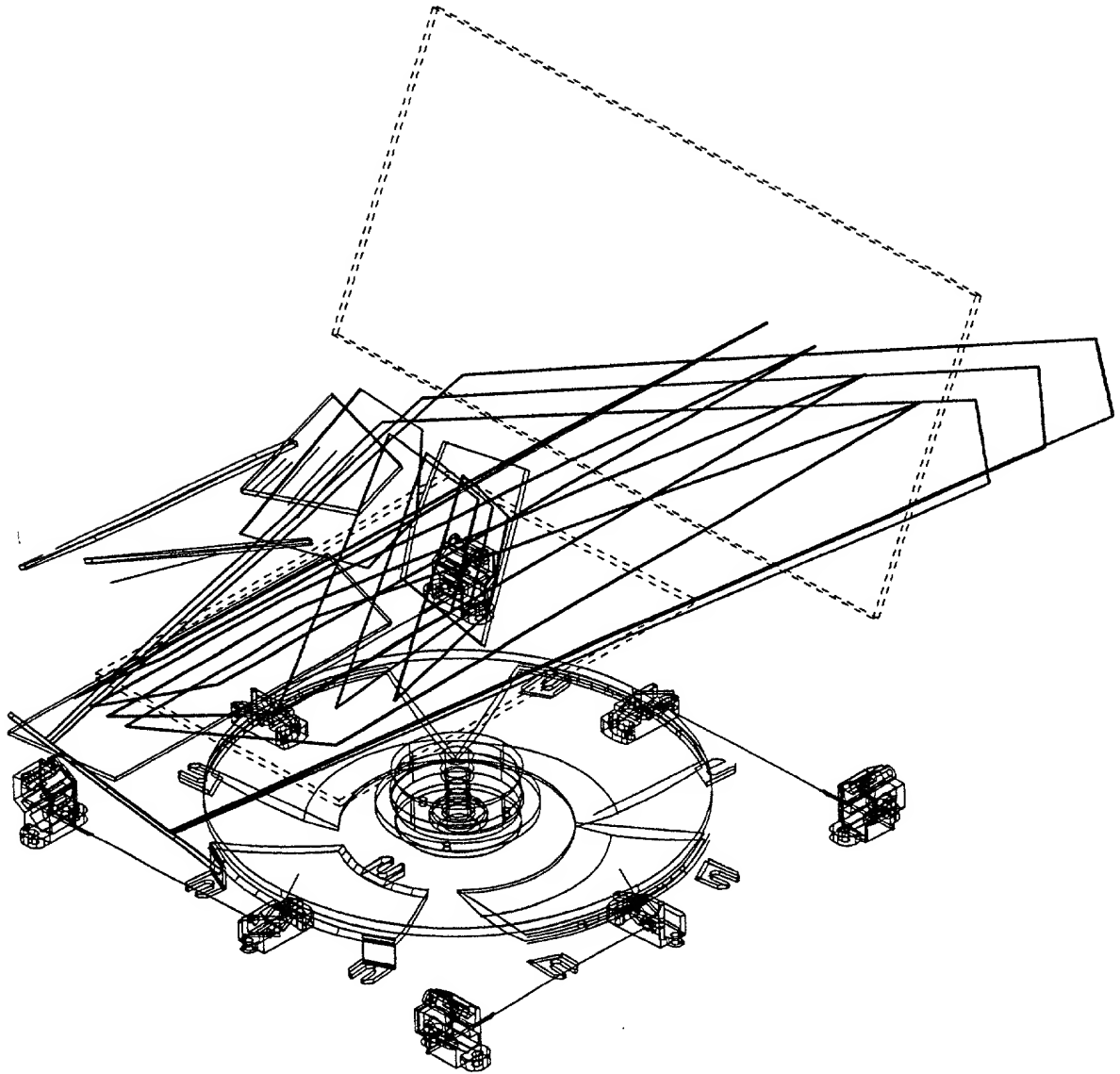


FIG. 5H6

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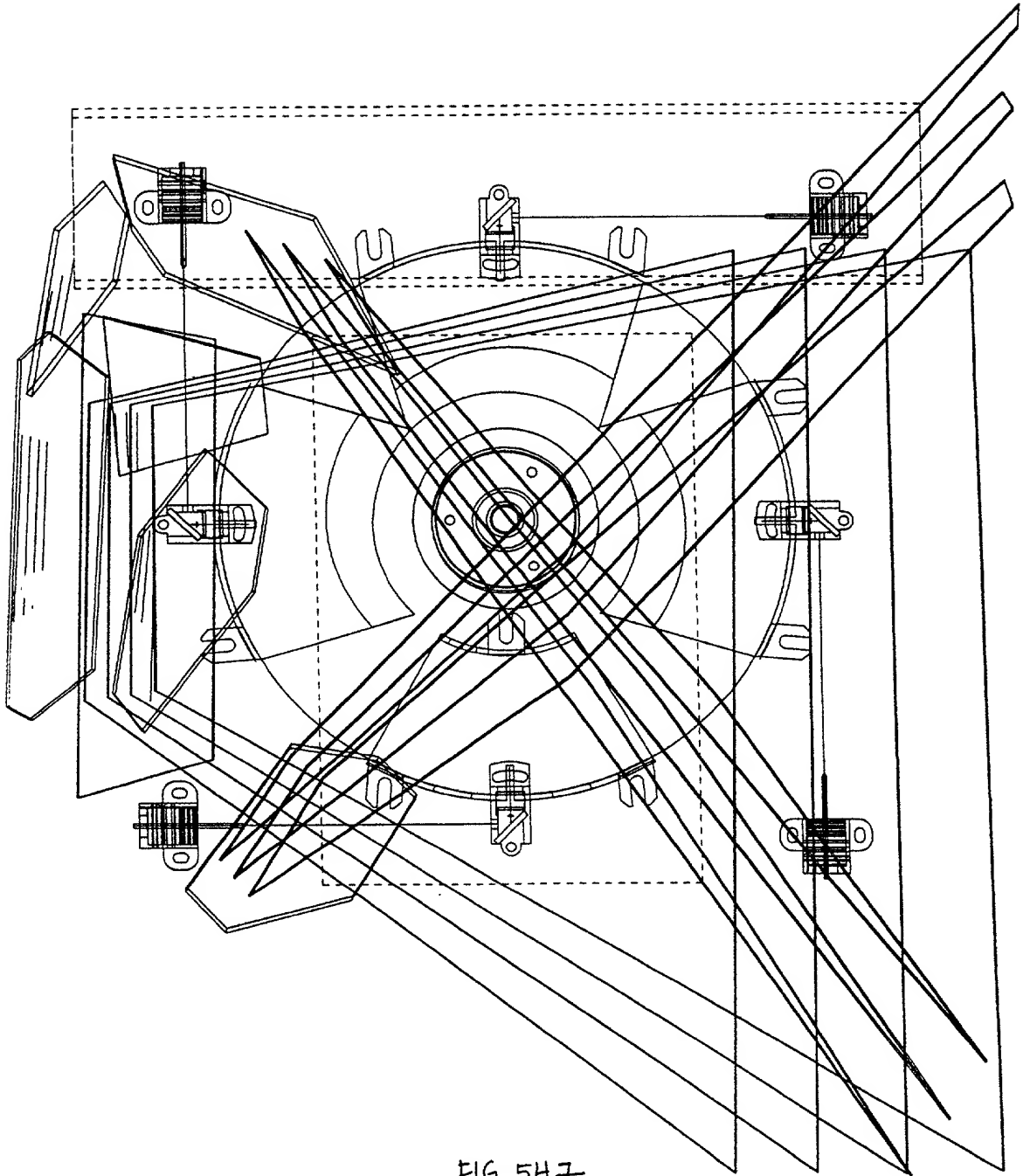


FIG. 5H7

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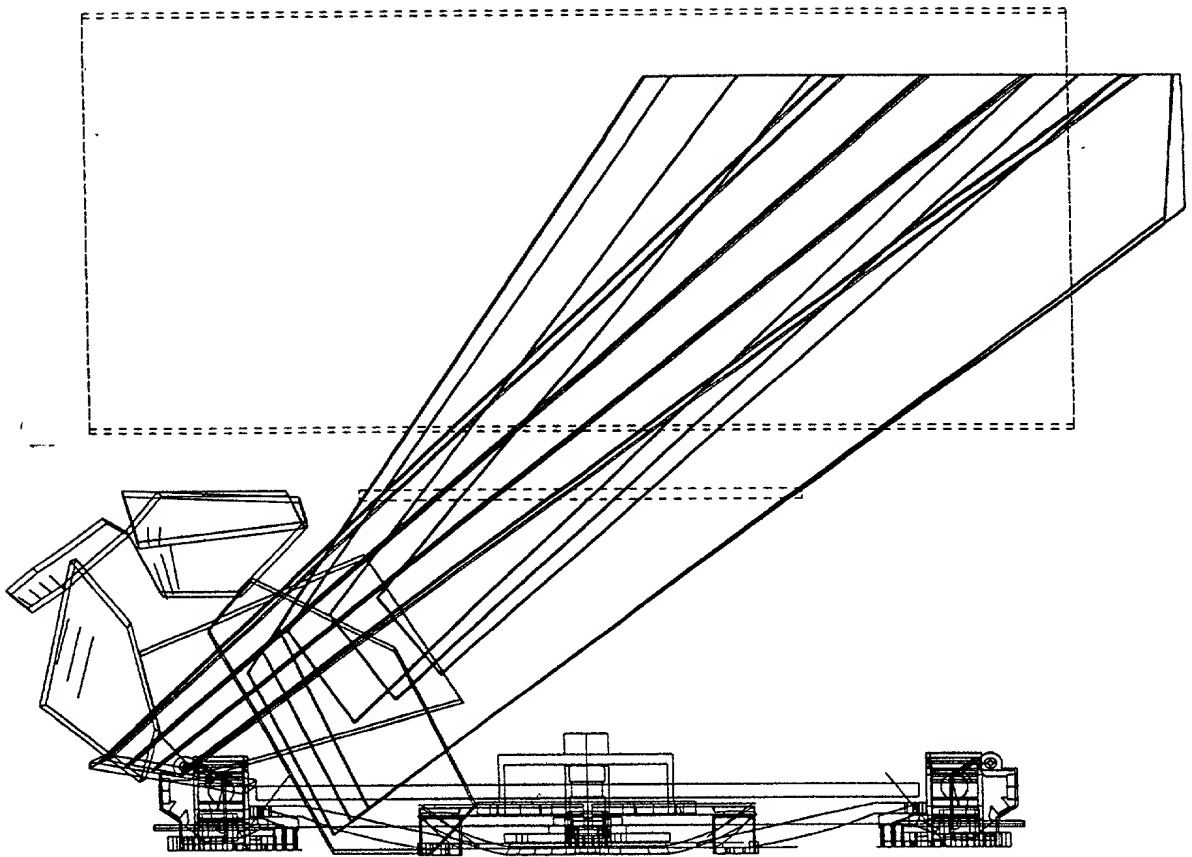


FIG. 5H8

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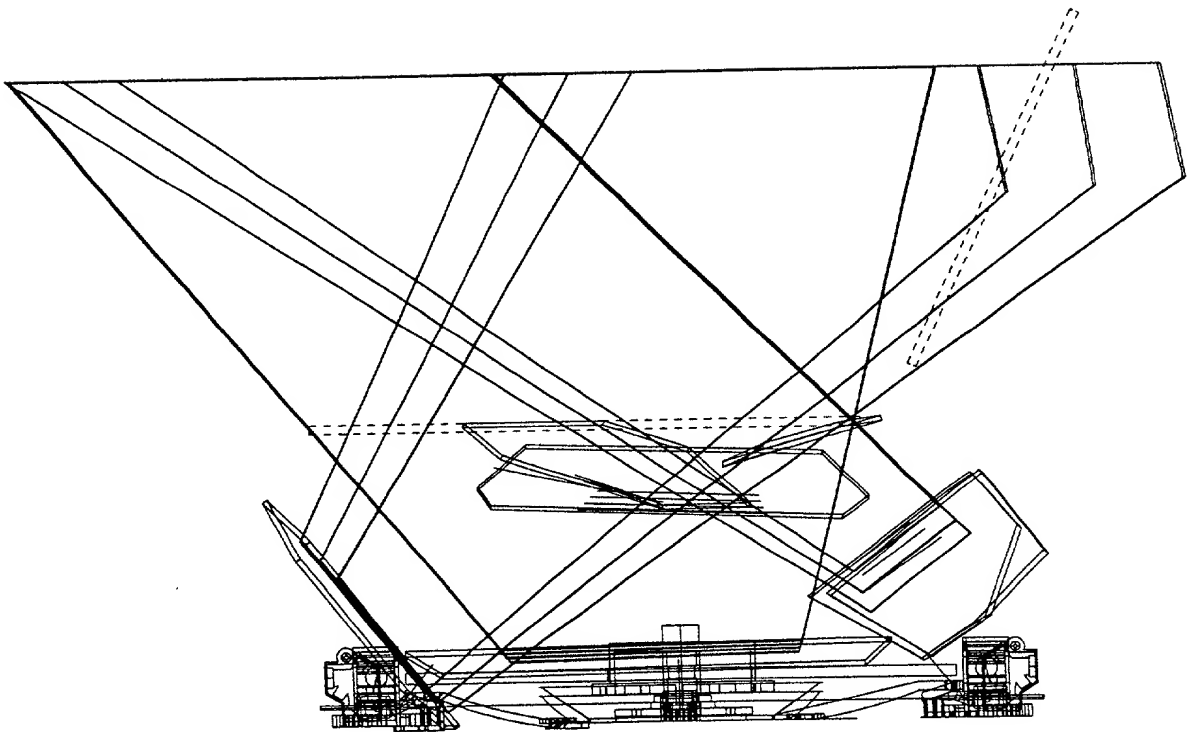


FIG. 5H9

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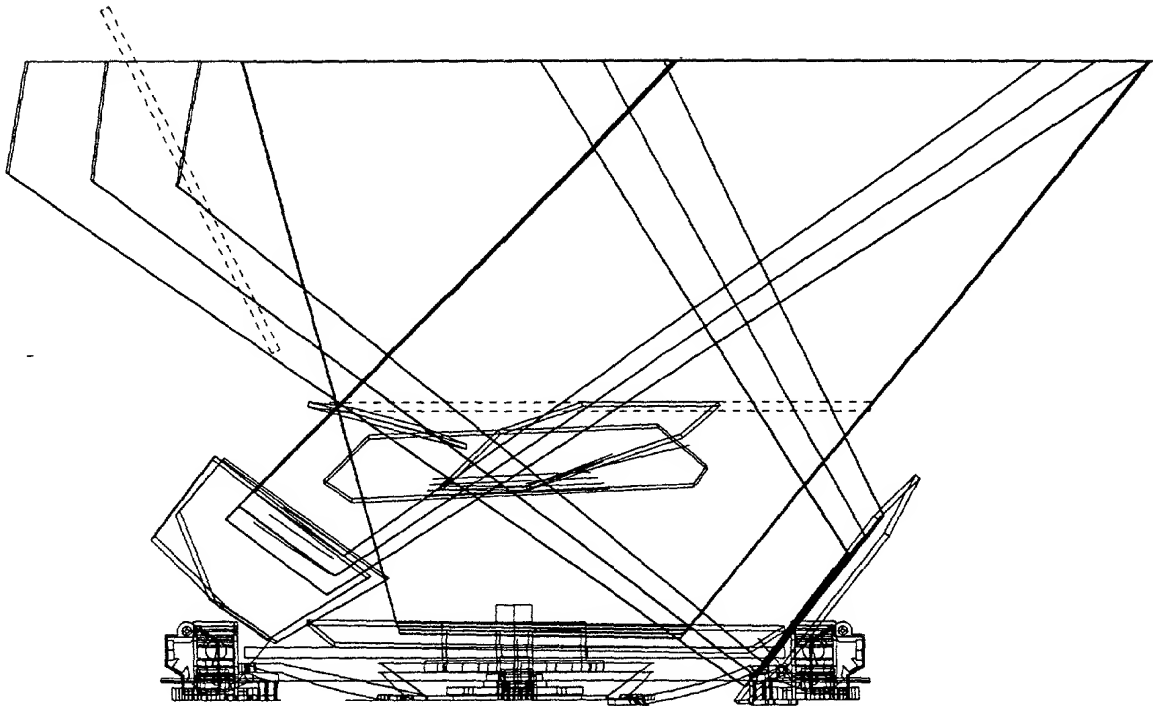


FIG. 5H10

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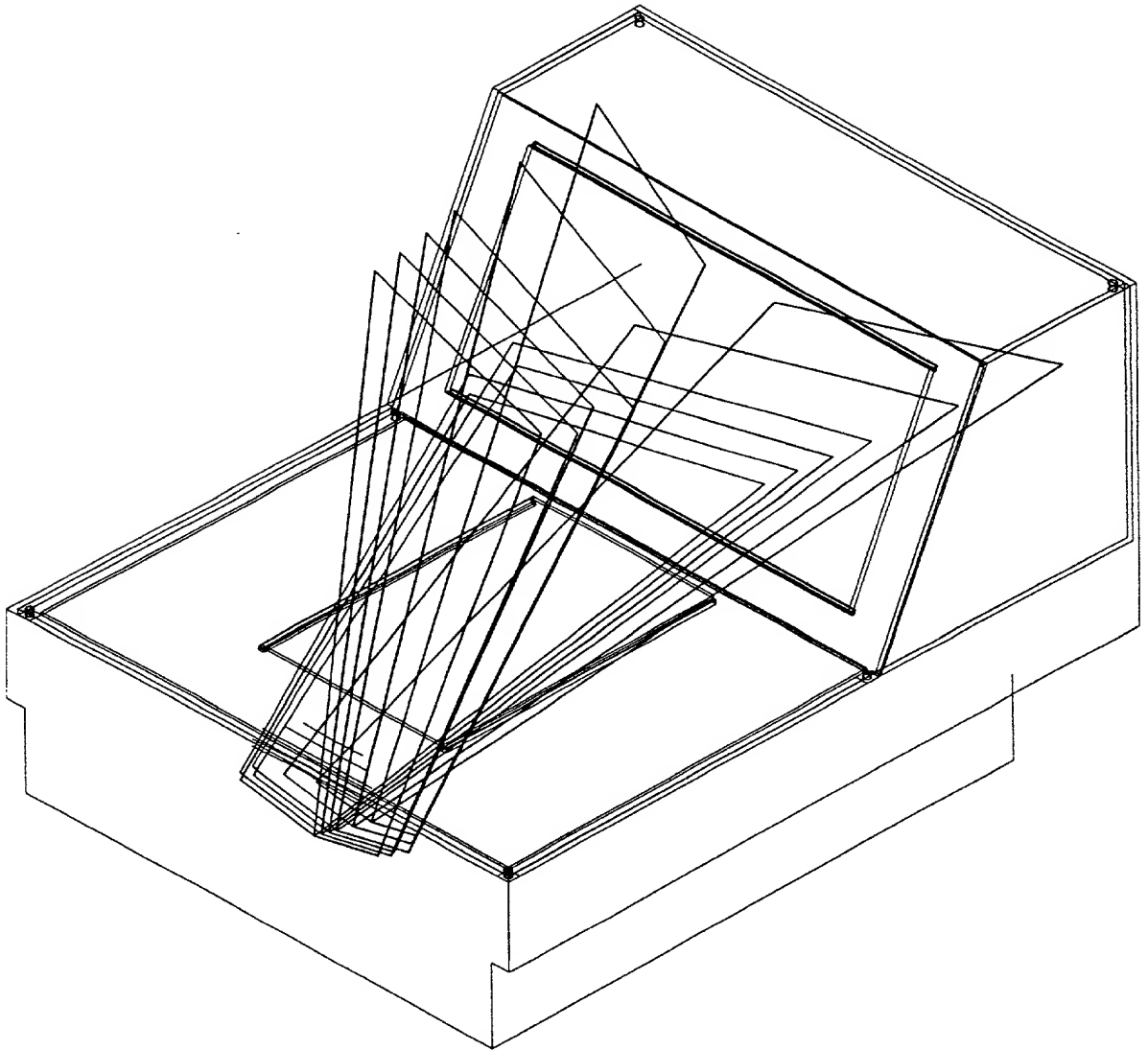


FIG. 5I1

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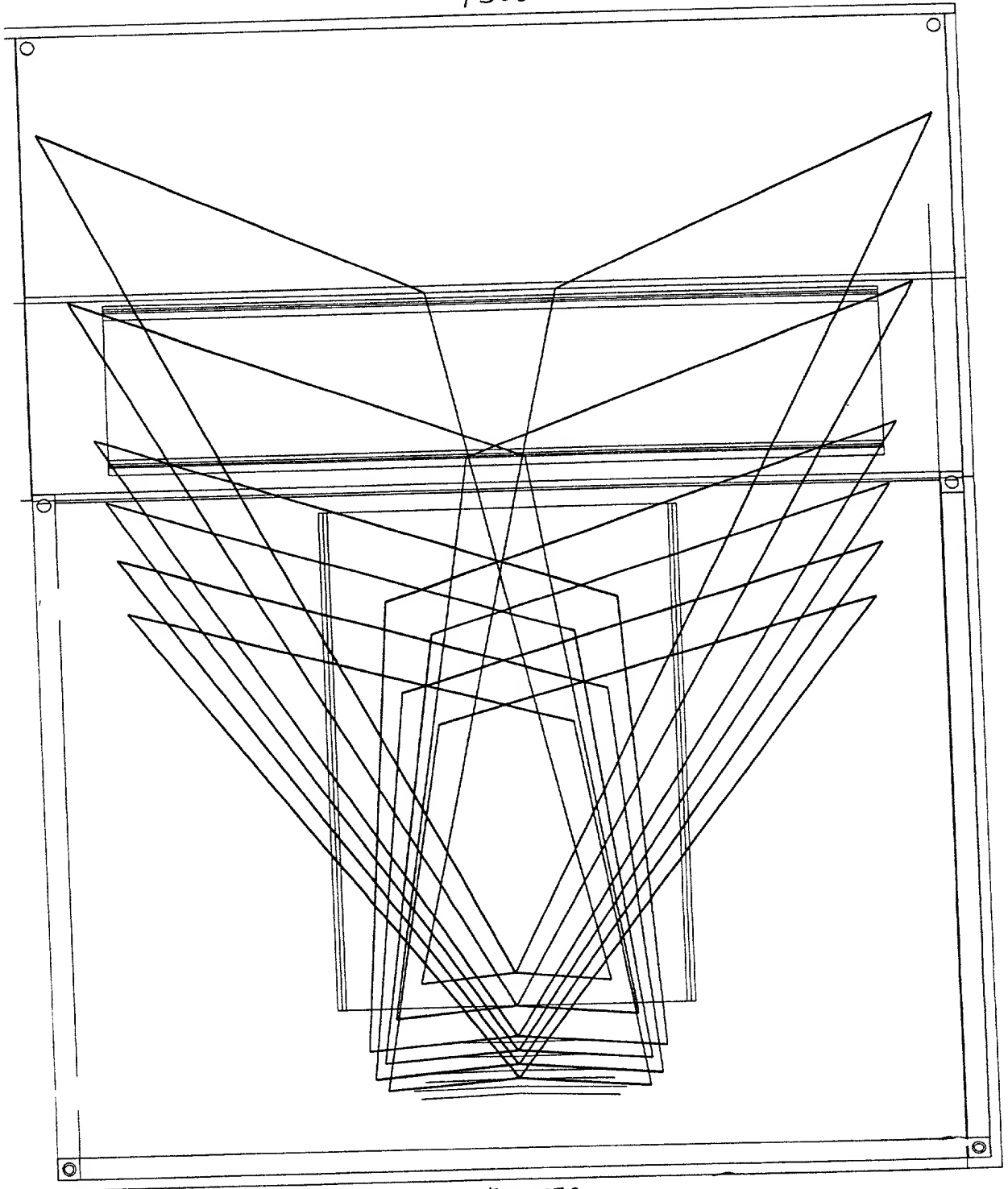


FIG. 512

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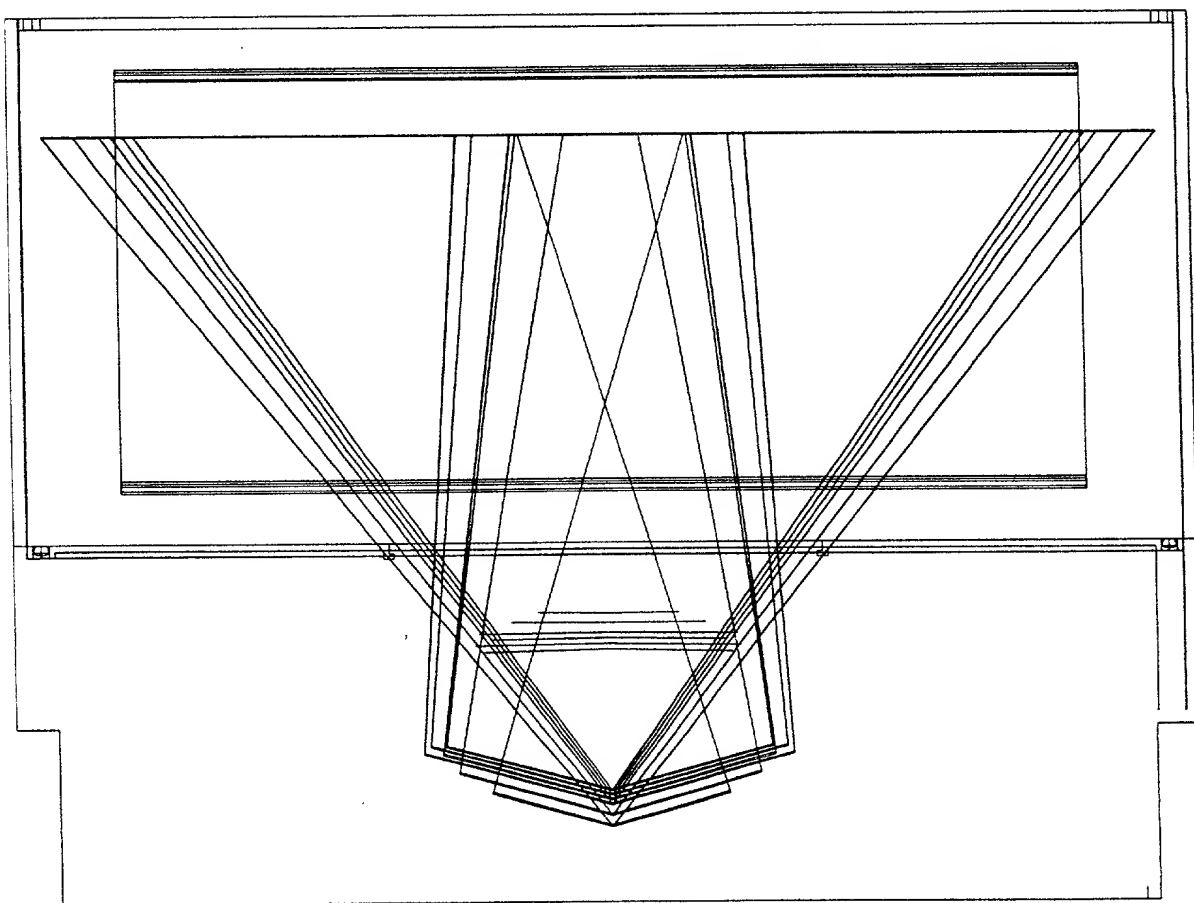


FIG. 5I3

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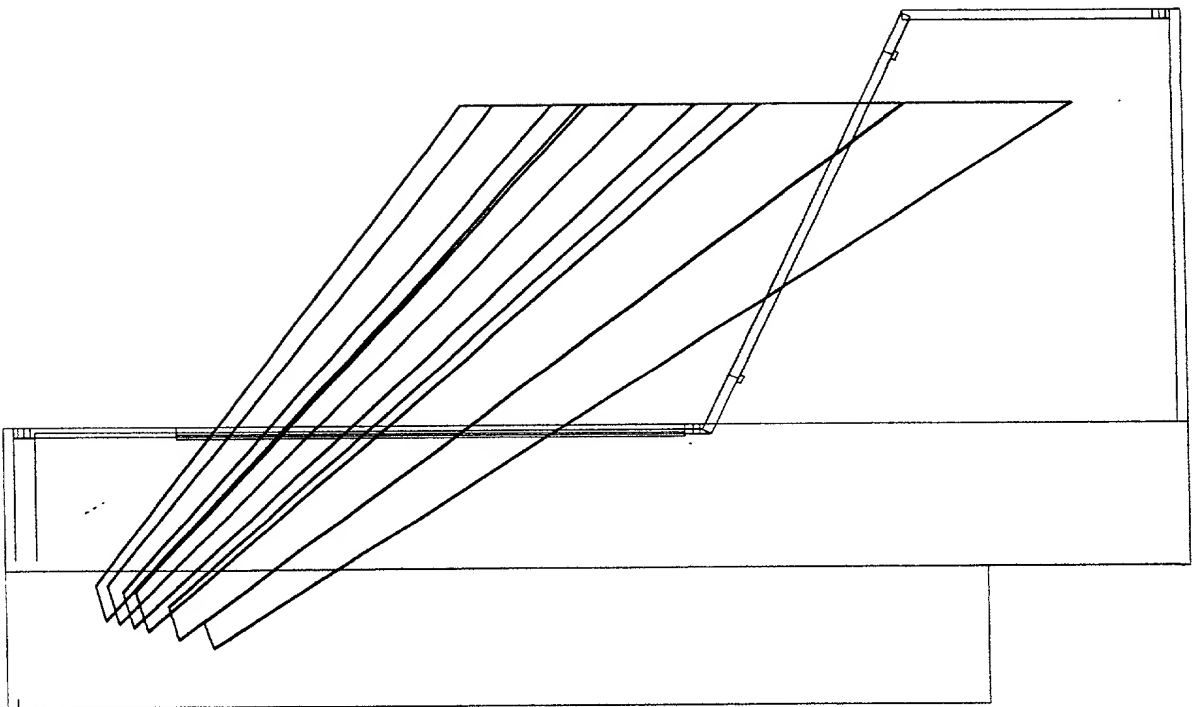


FIG. 5I4

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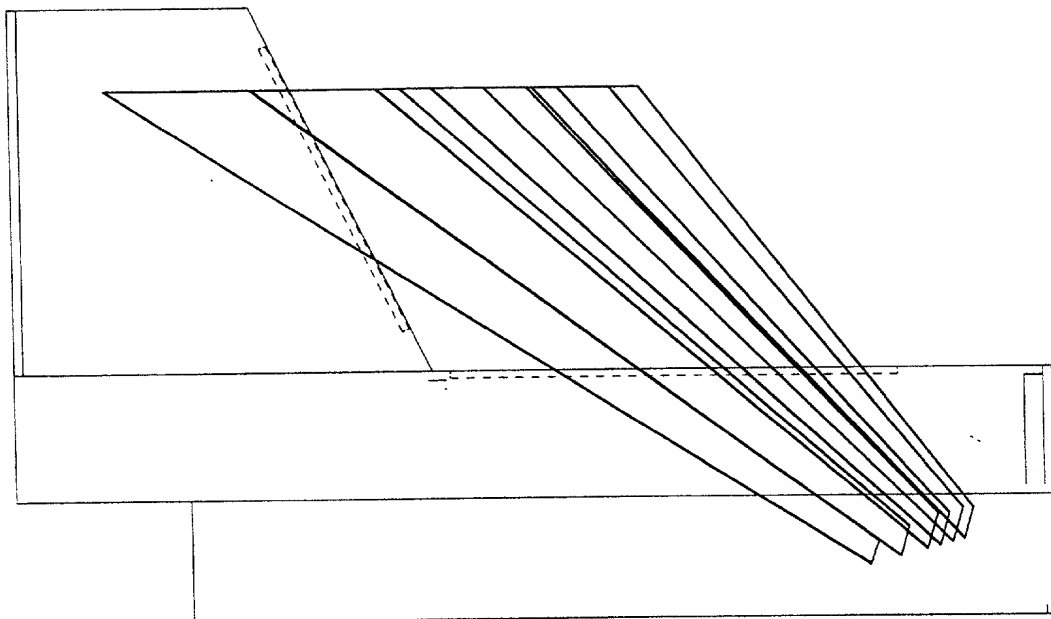


FIG. 5I5

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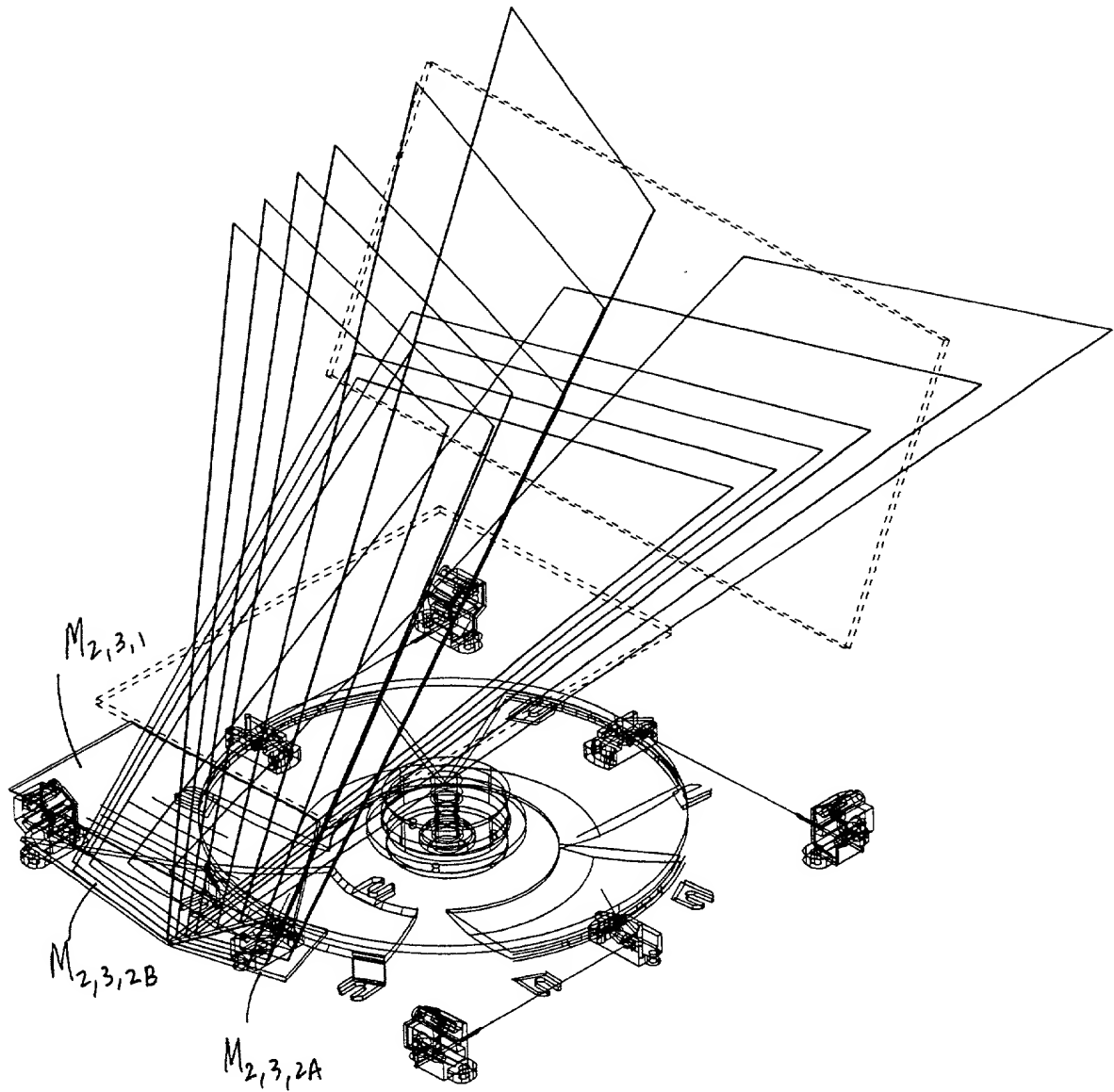


FIG 5J1

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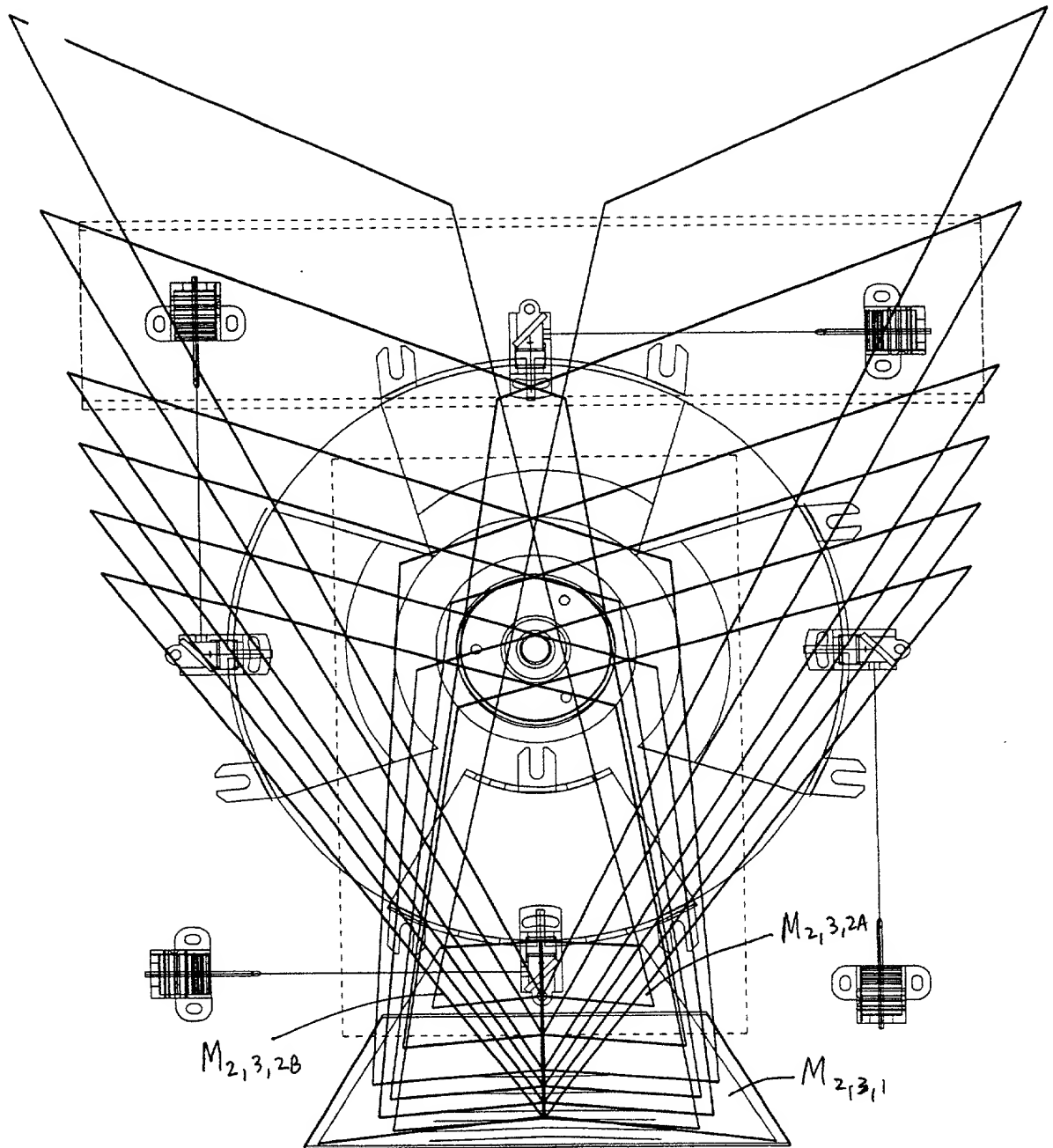


FIG. 5J2

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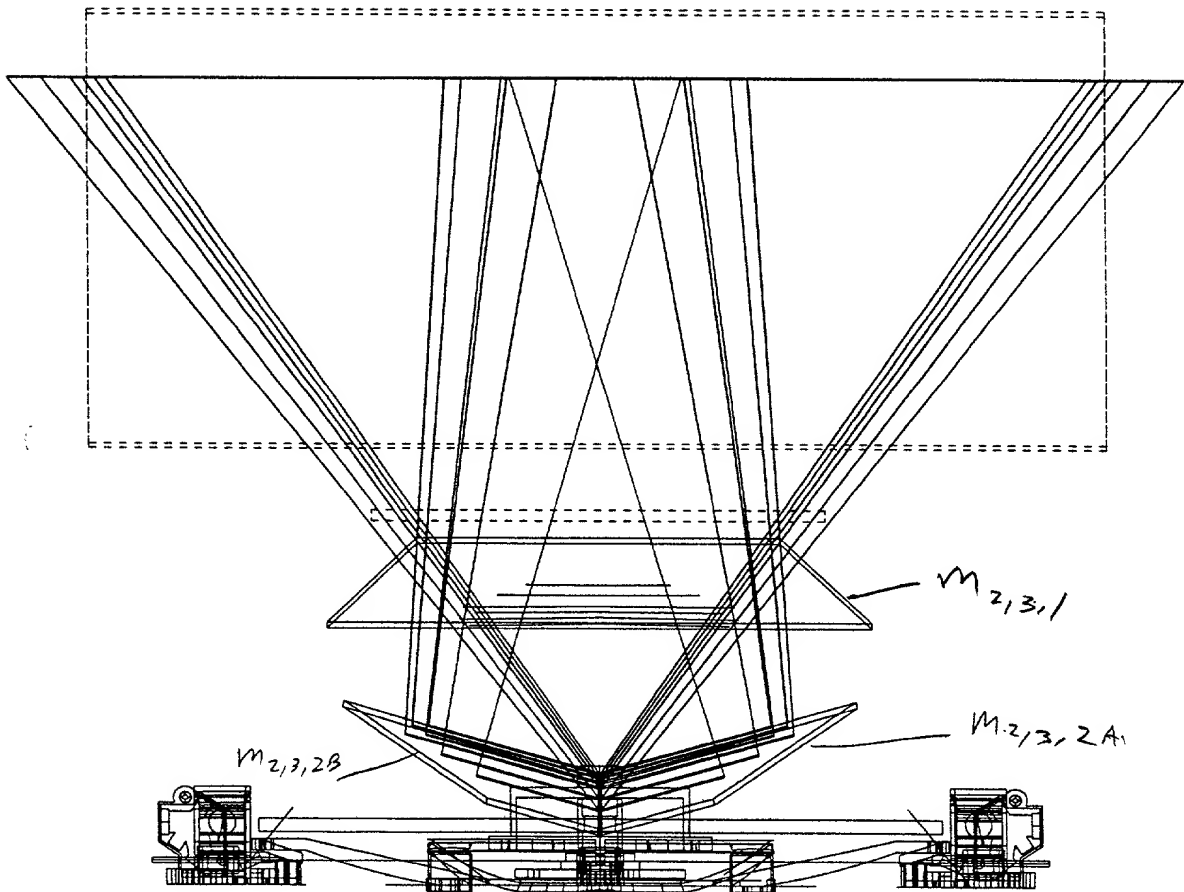


FIG 5J3

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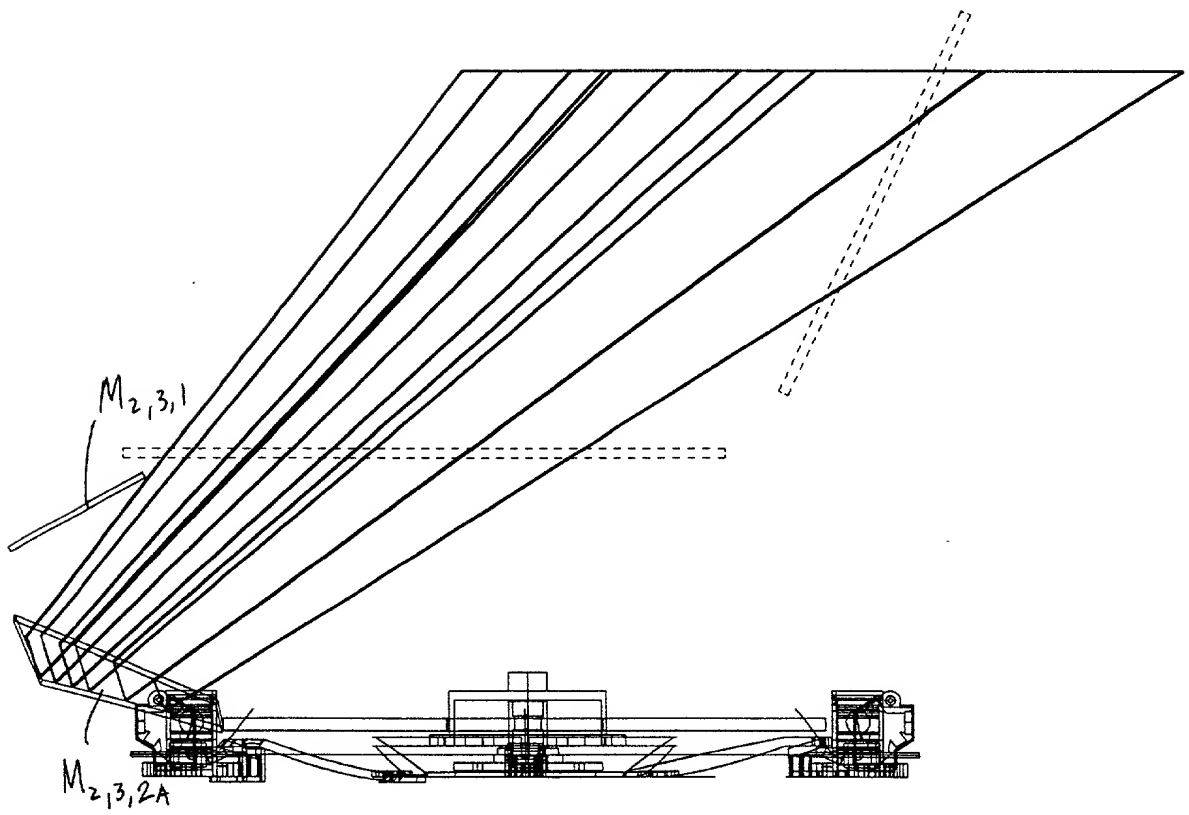


FIG. 5J4

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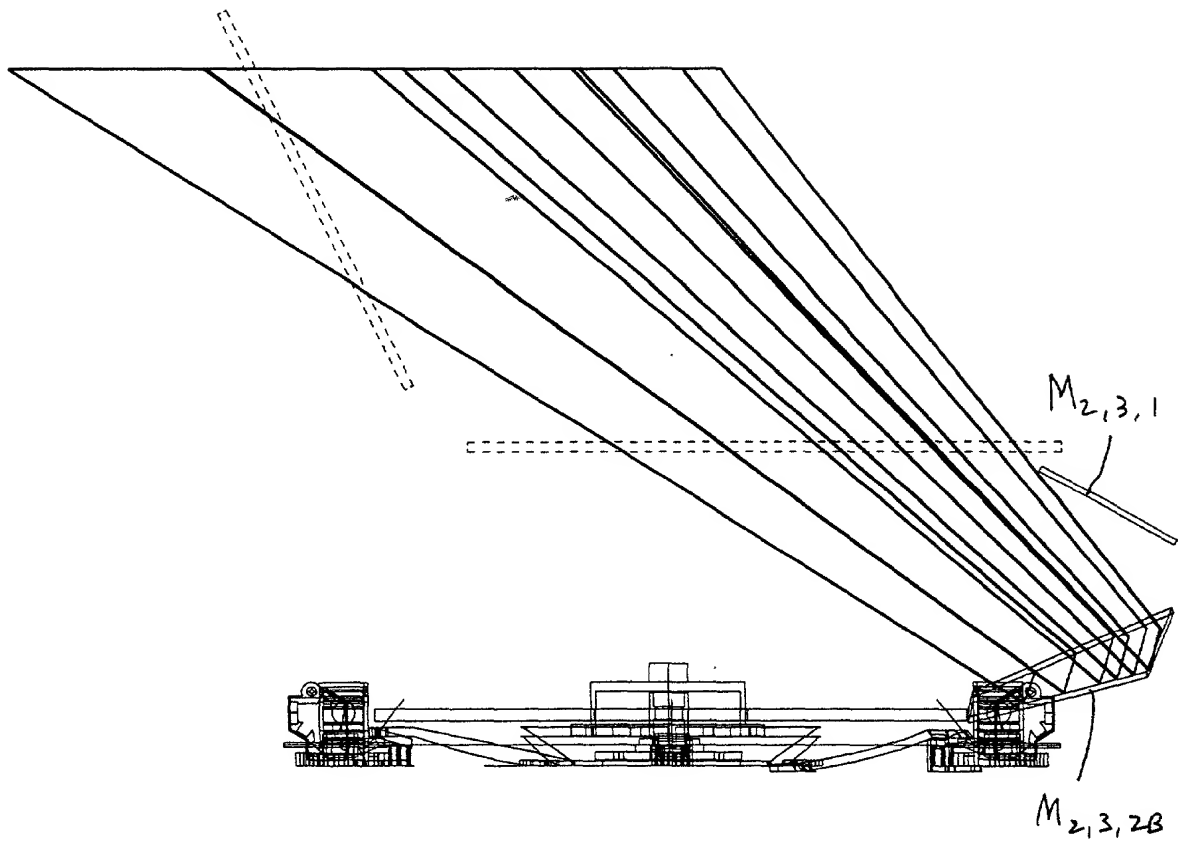


FIG. 5J5

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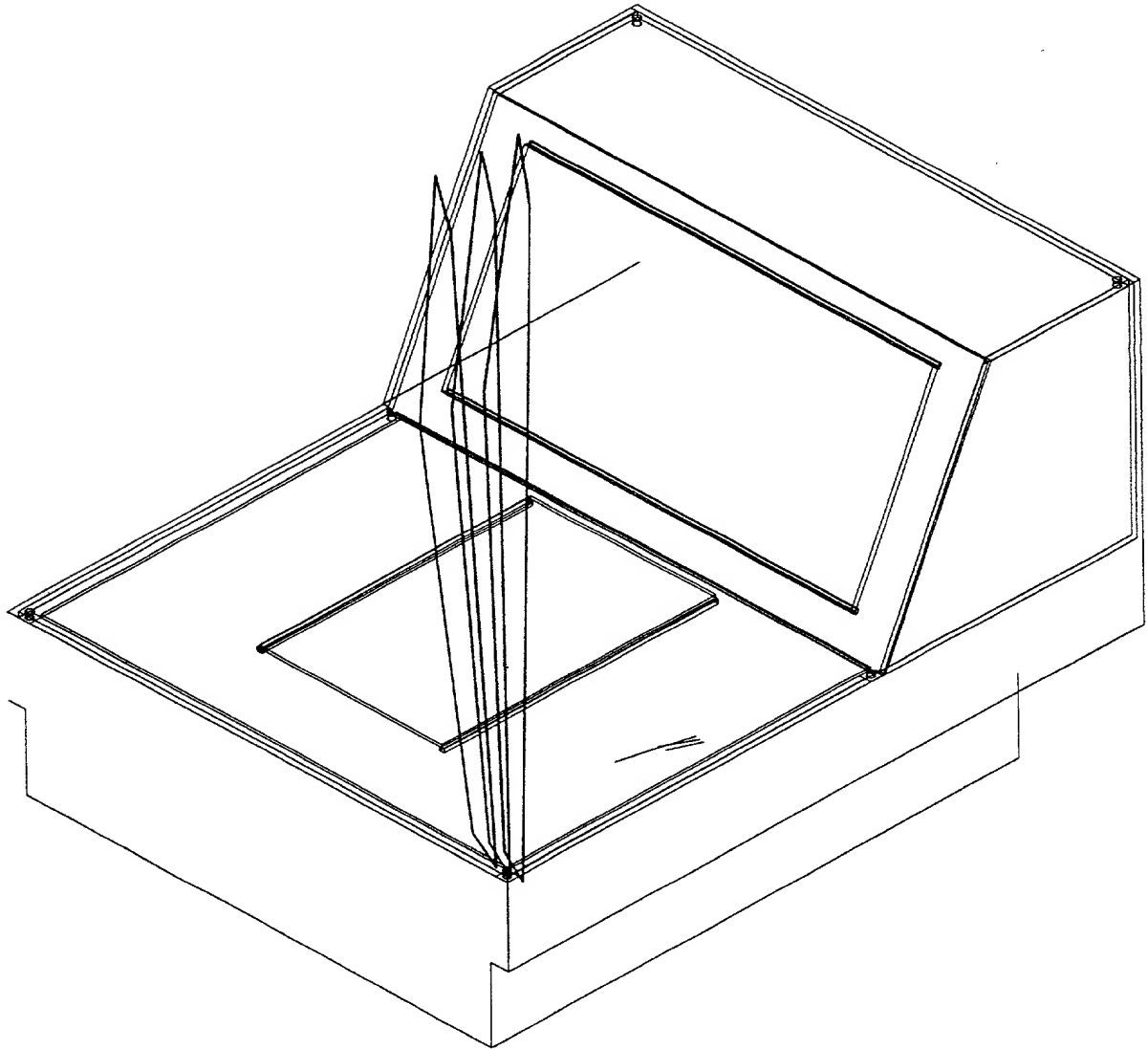


FIG. 5K1

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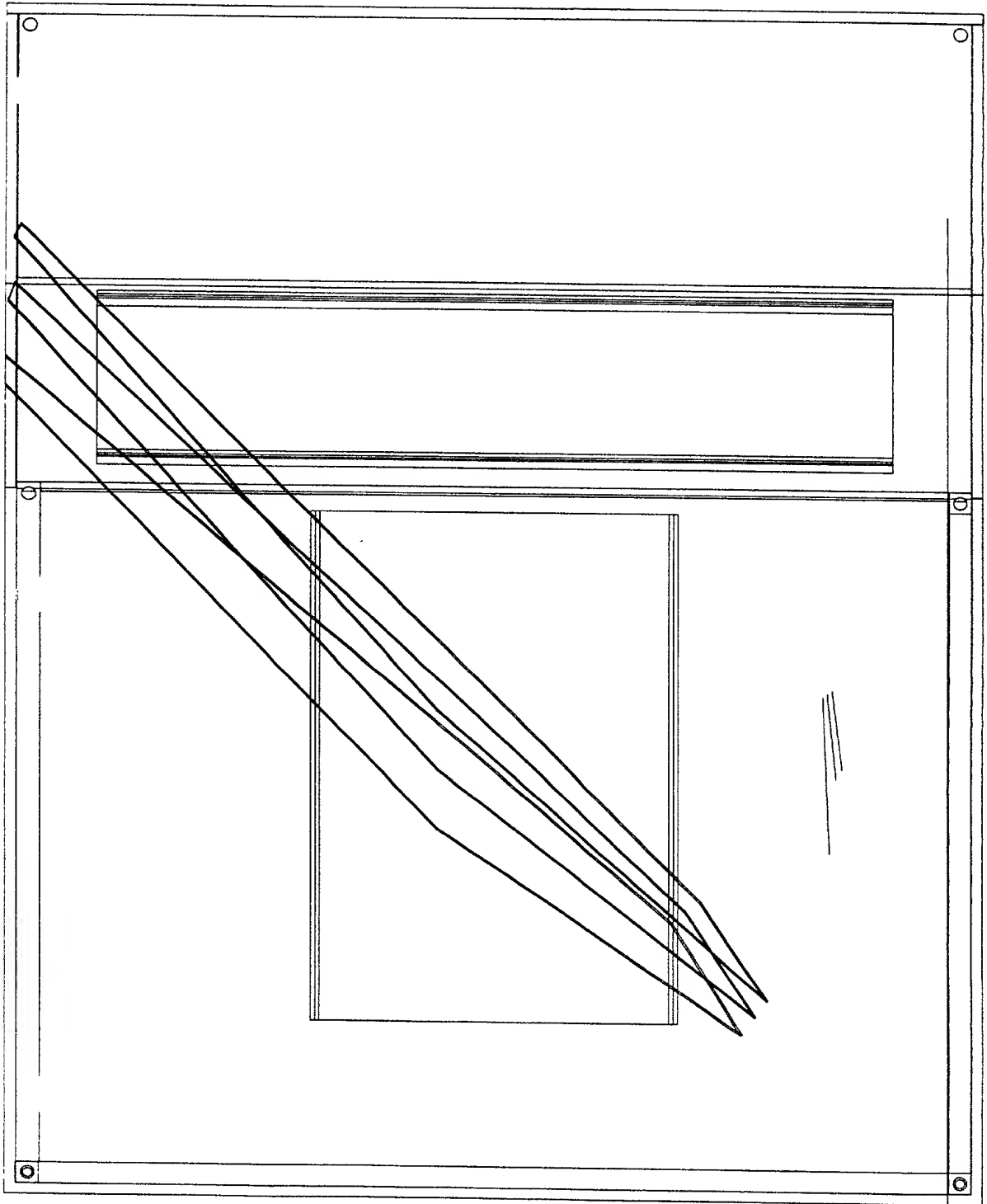


FIG. 5K2

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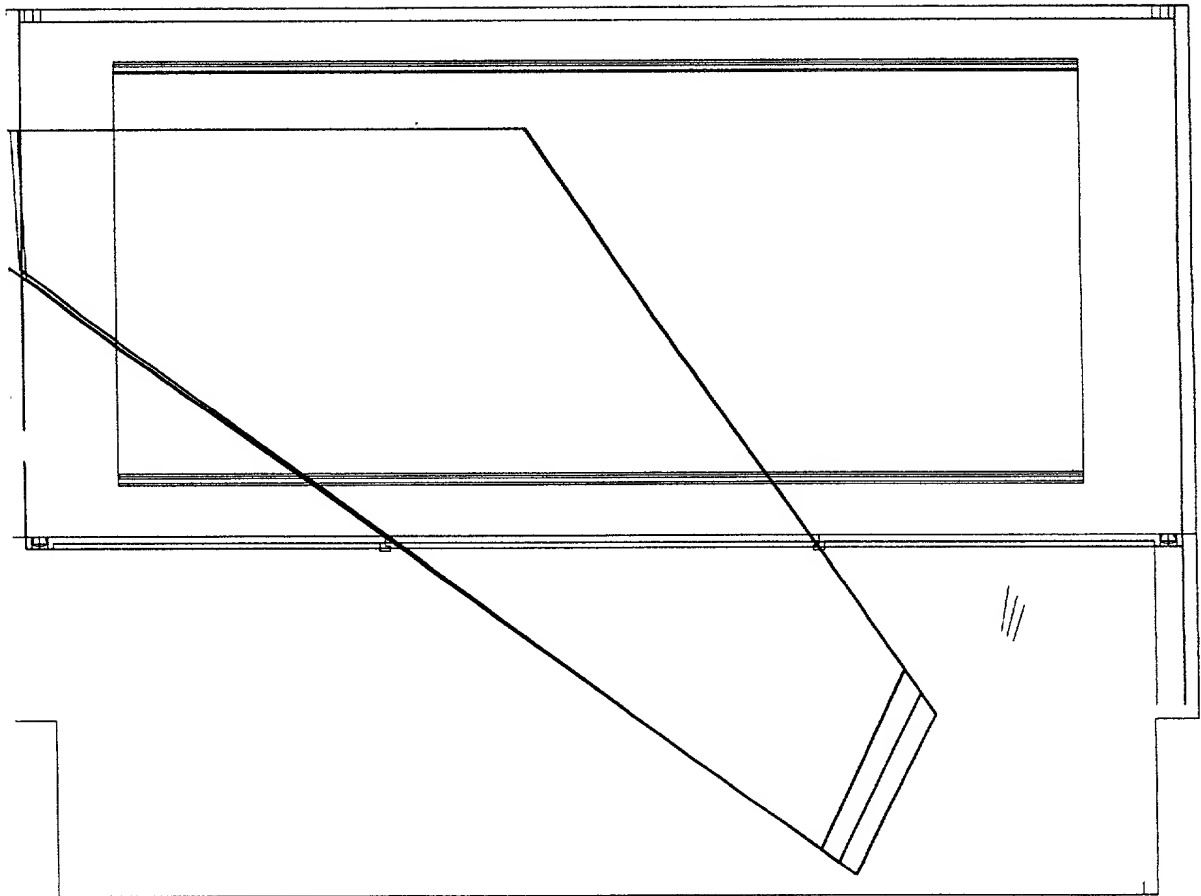


FIG 5K3

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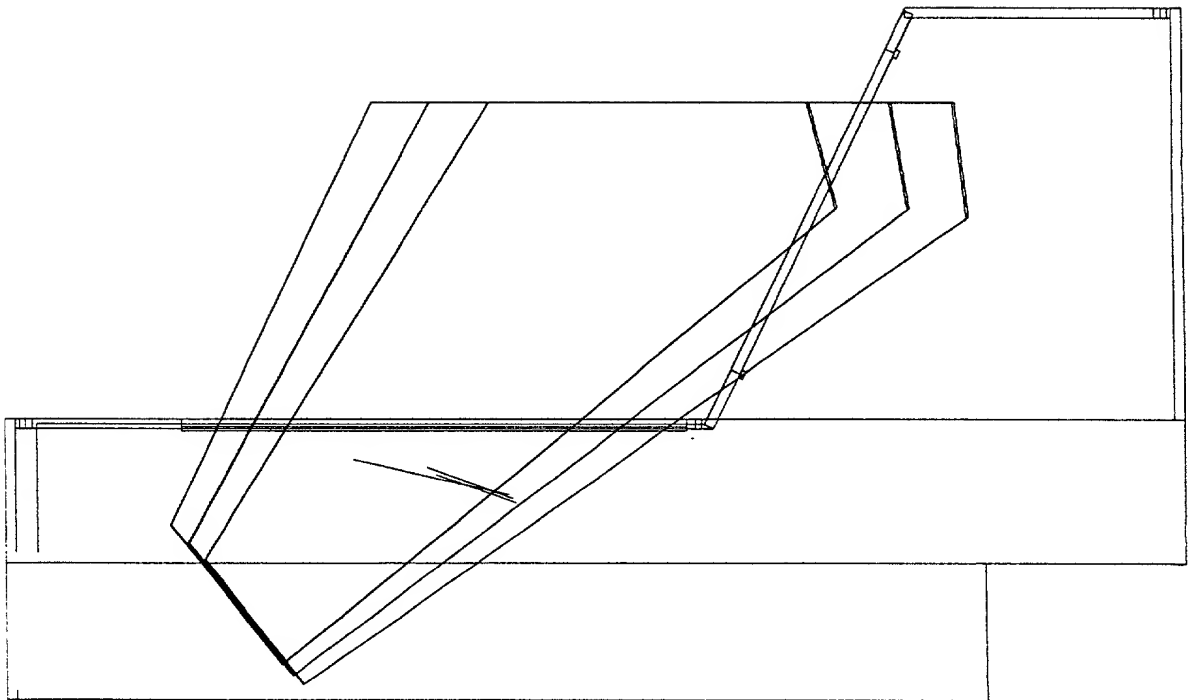


FIG. 5K4

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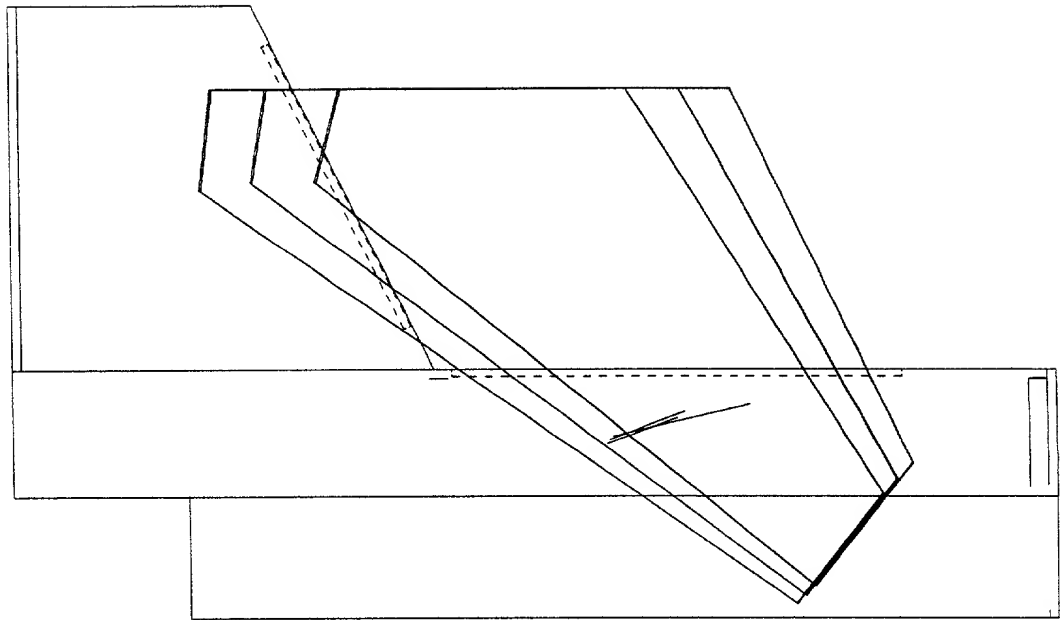


FIG. 5K5

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FIG. 5L1

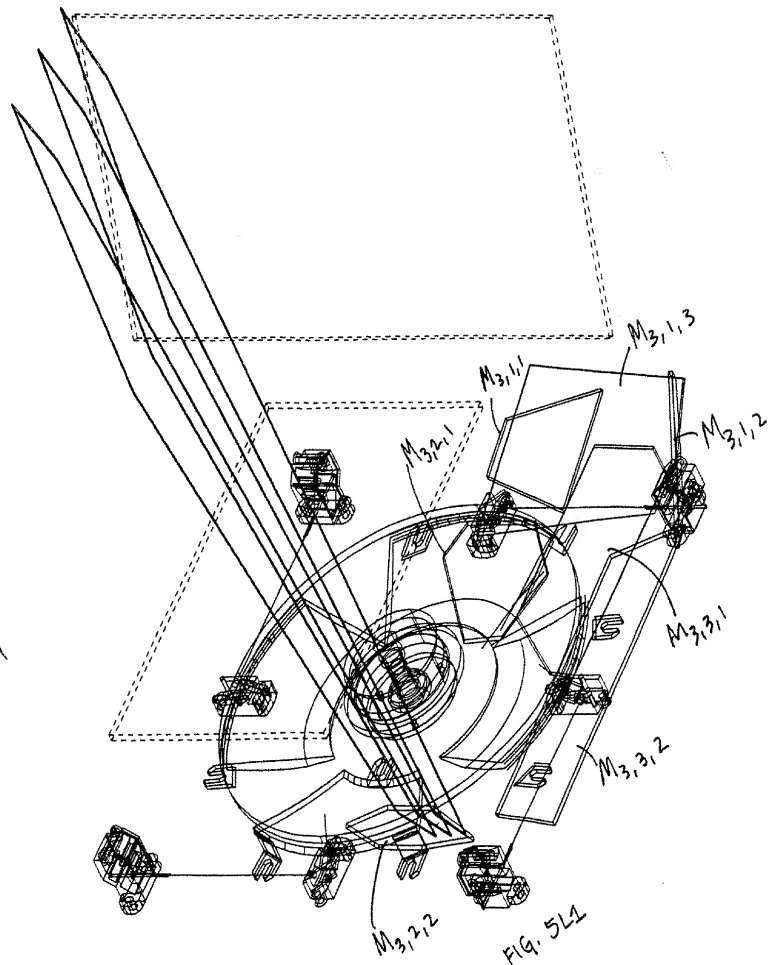


FIG. 5L1

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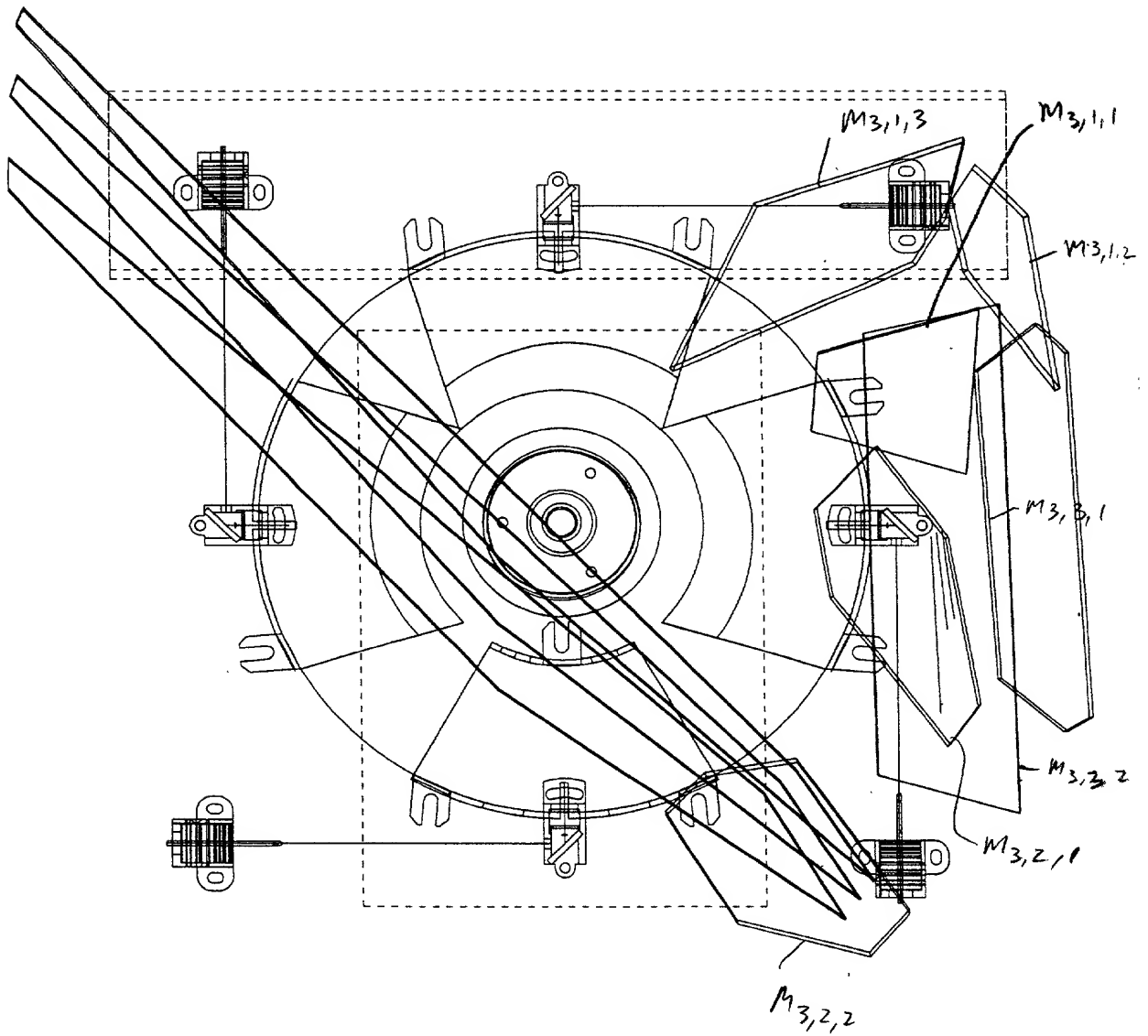


FIG. 5L2

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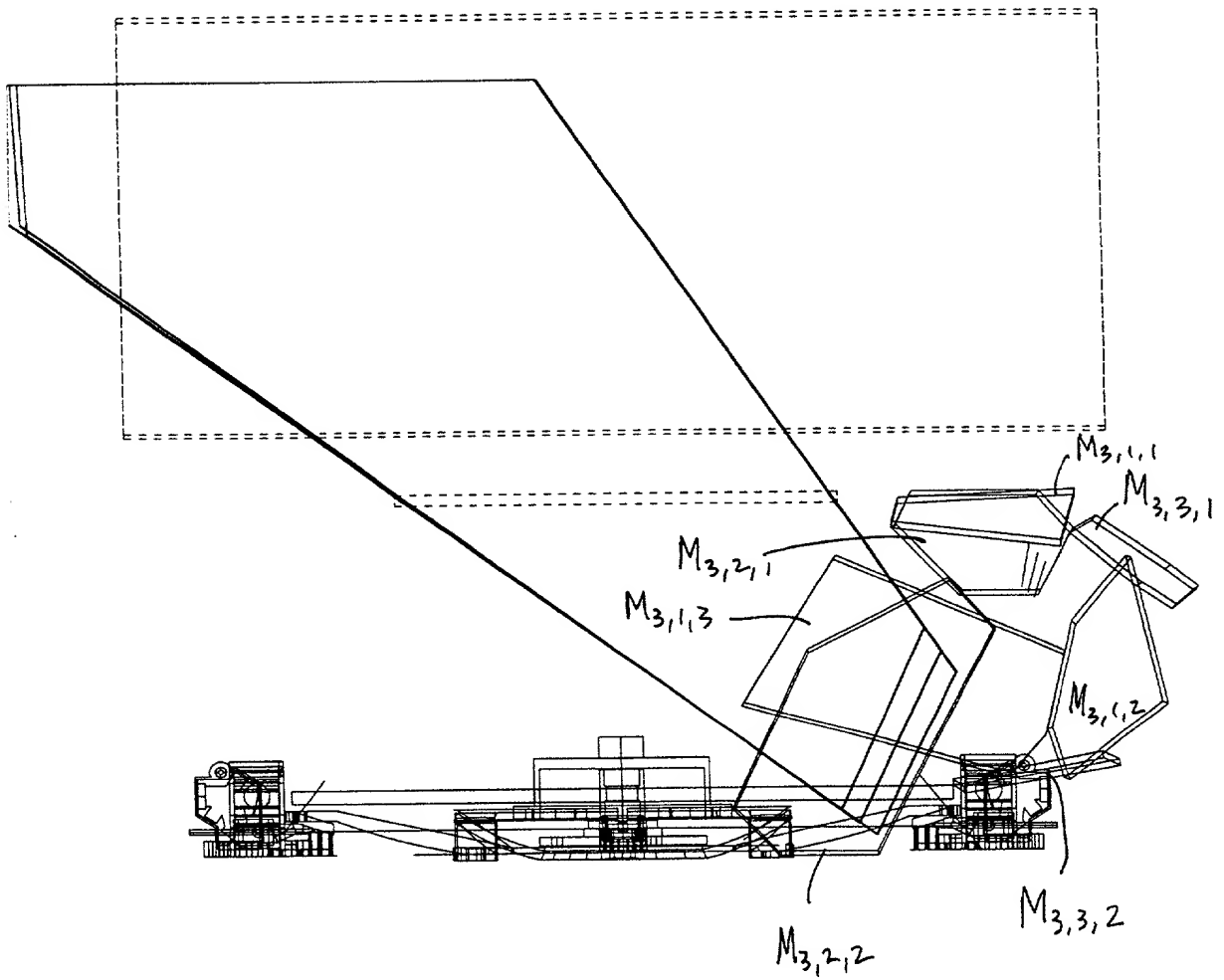


FIG. 5L3

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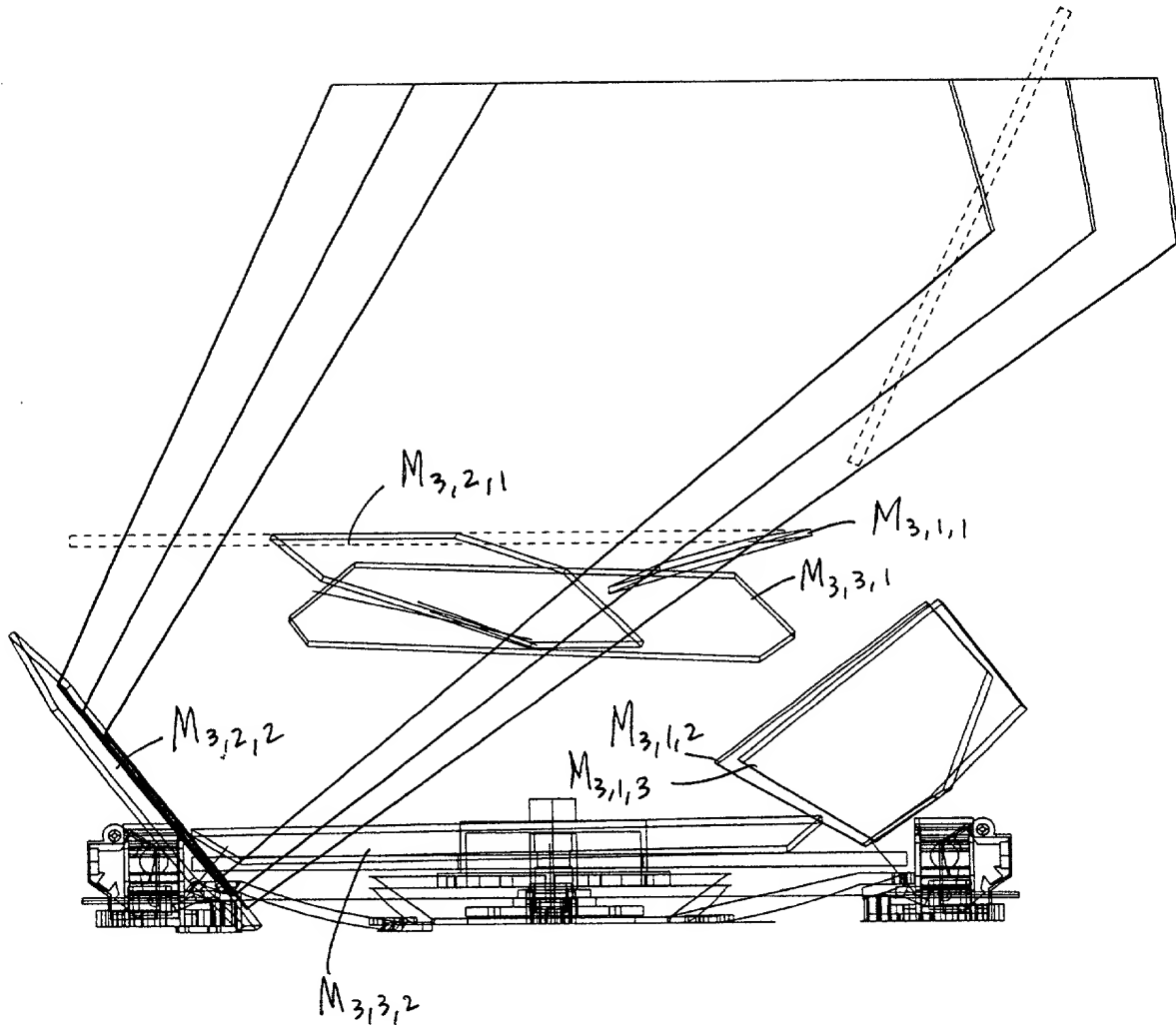


FIG. 5L4

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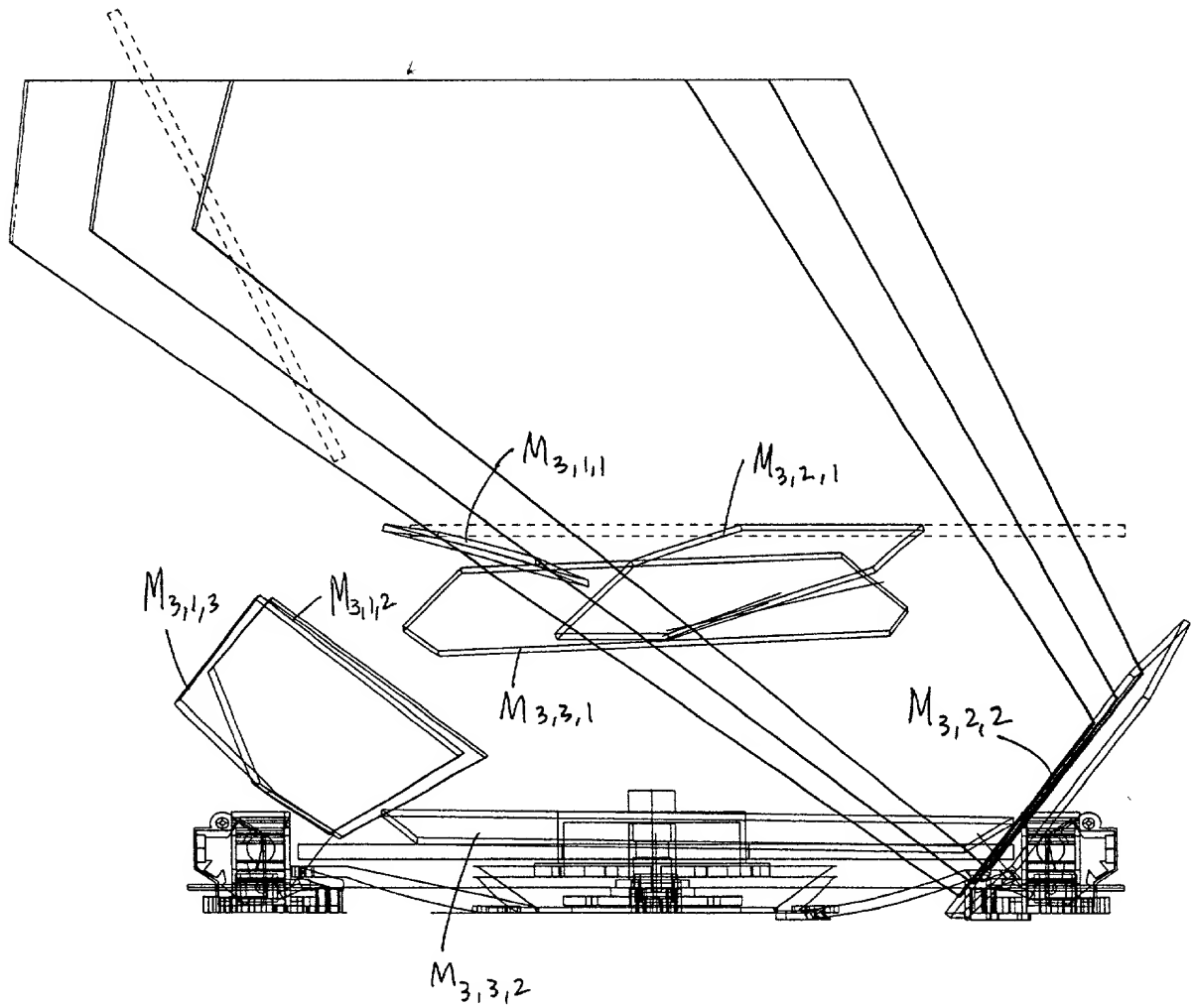


FIG. 5L5

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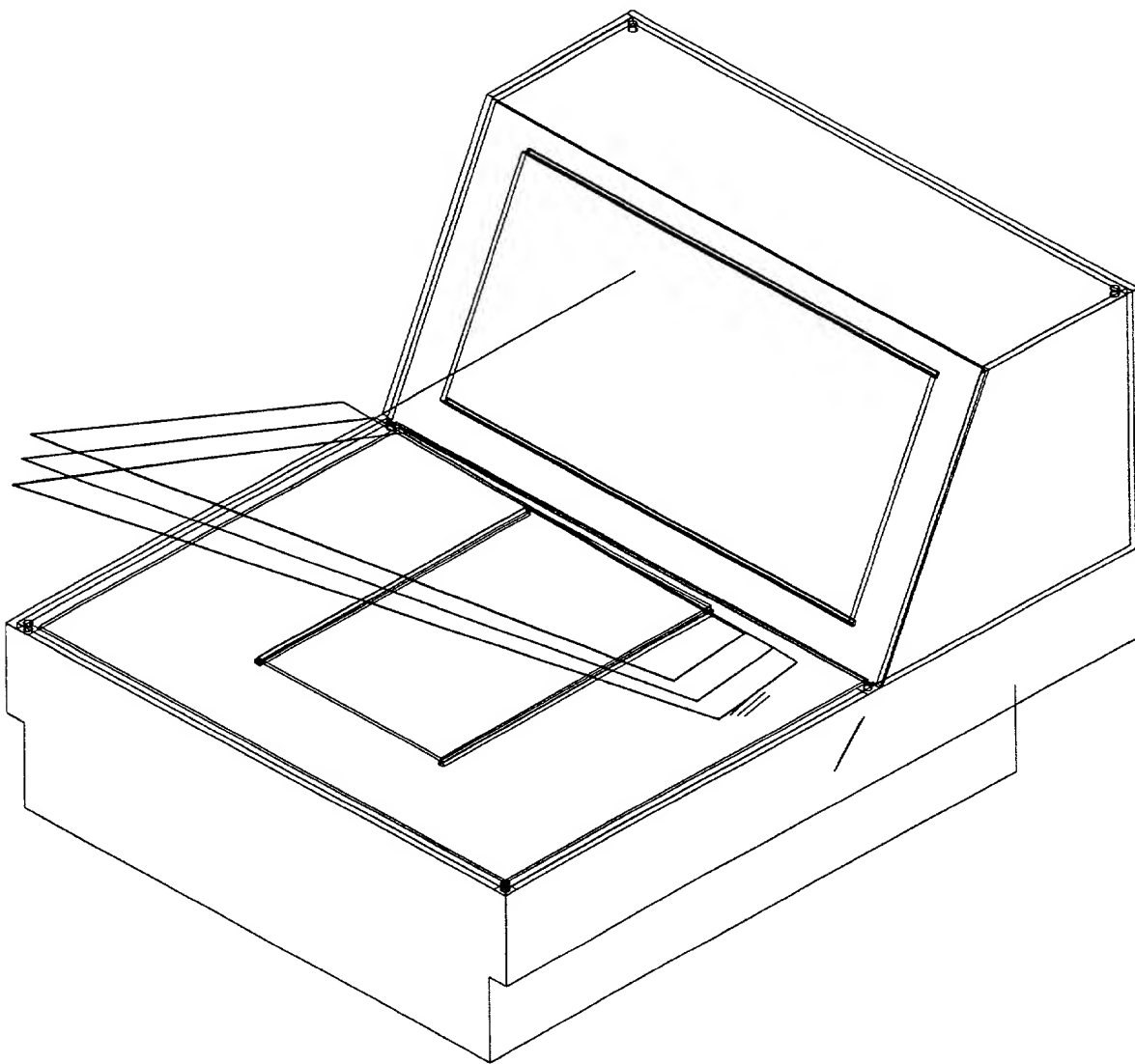


FIG. 5M1

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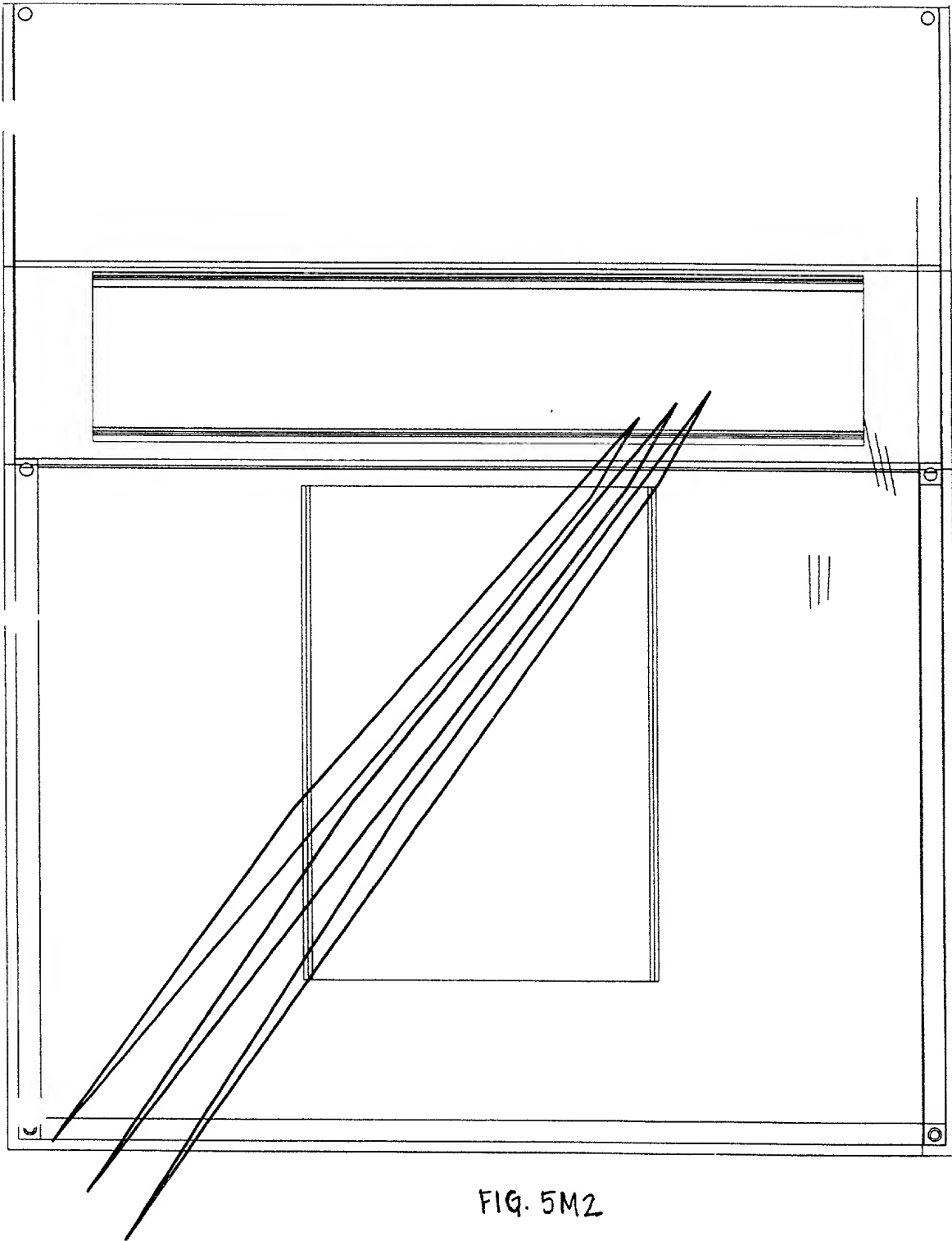


FIG. 5M2

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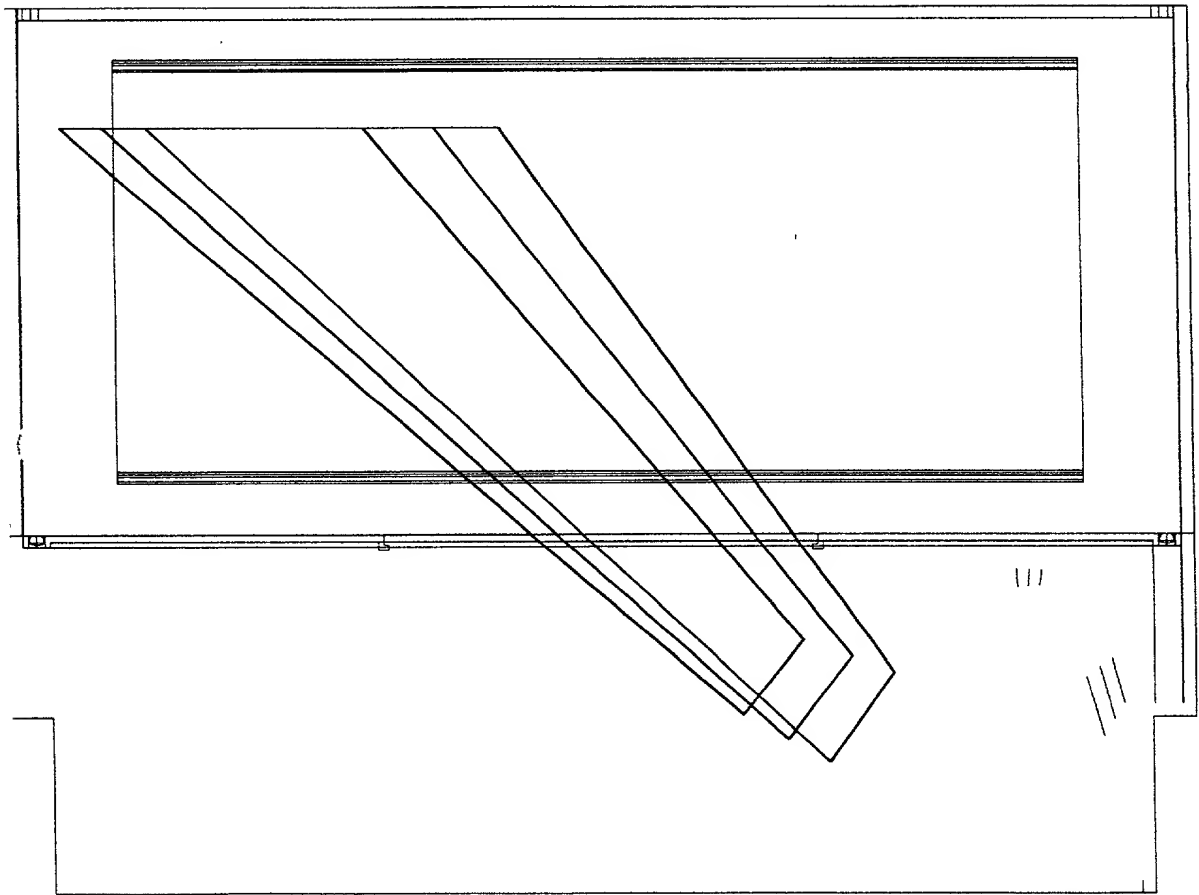


FIG. 5M3

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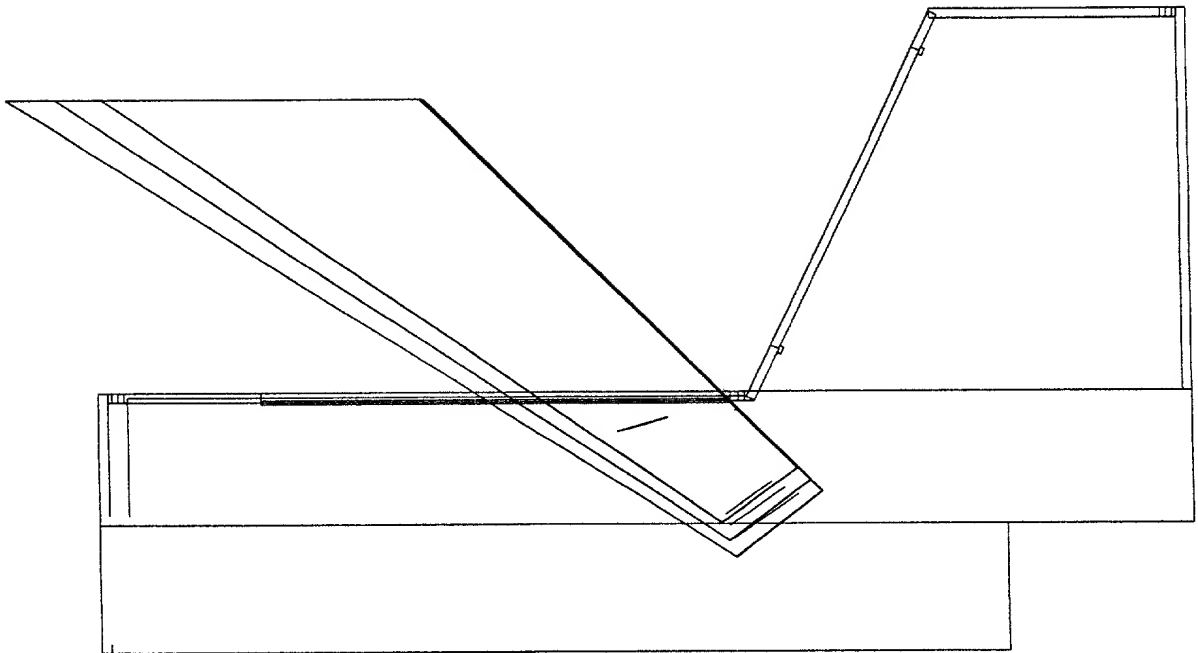


FIG. 5M4

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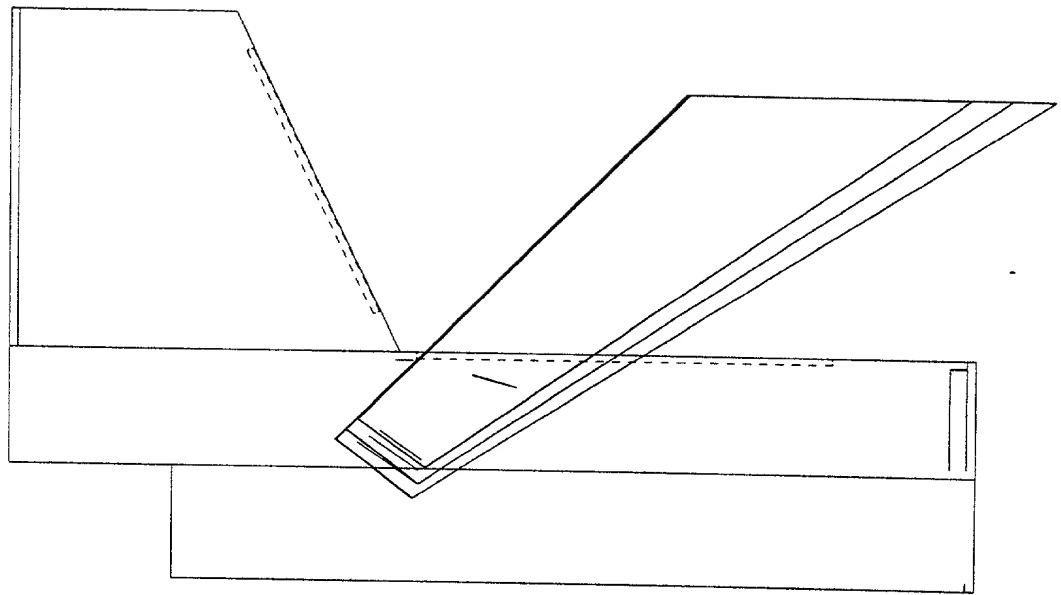


FIG. 5M5

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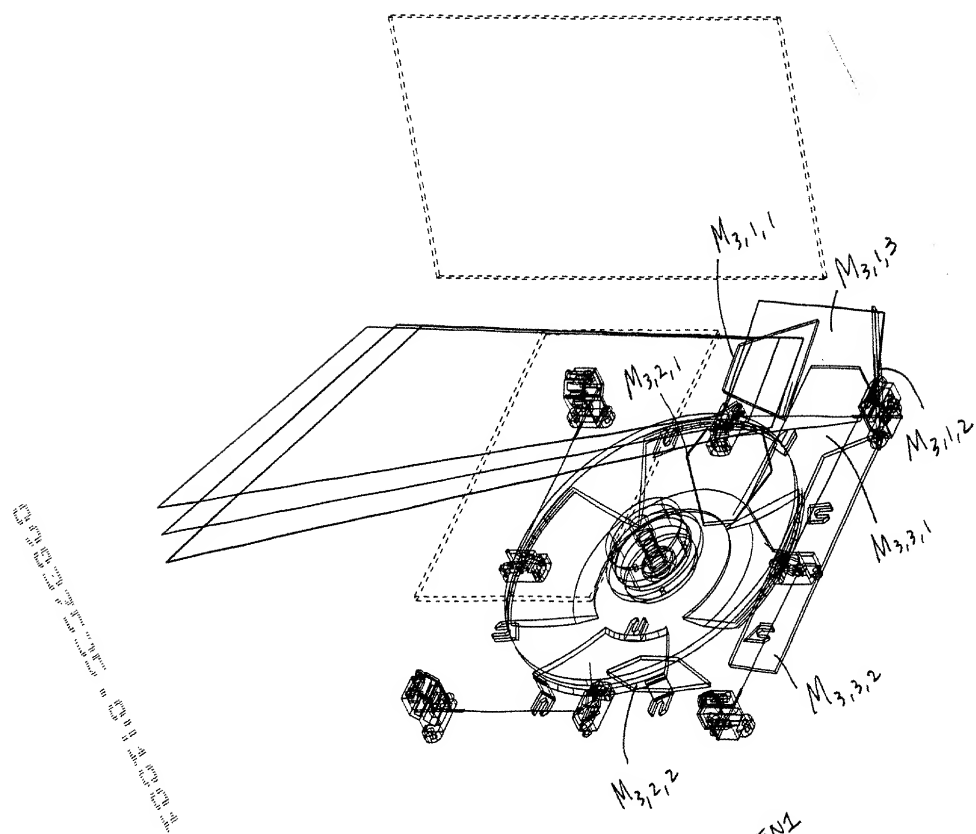


FIG. 5N1

131/335-

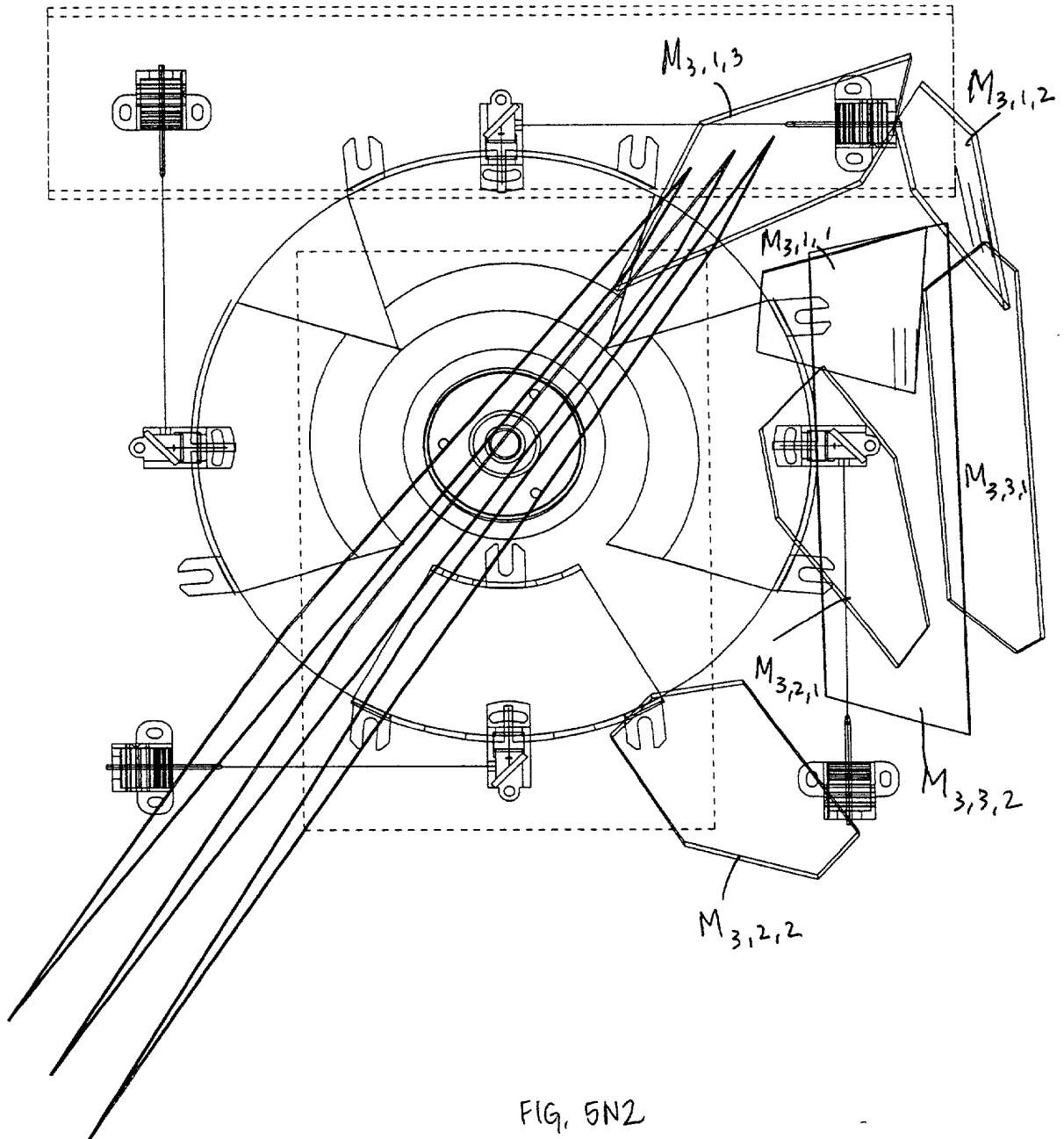


FIG. 5N2

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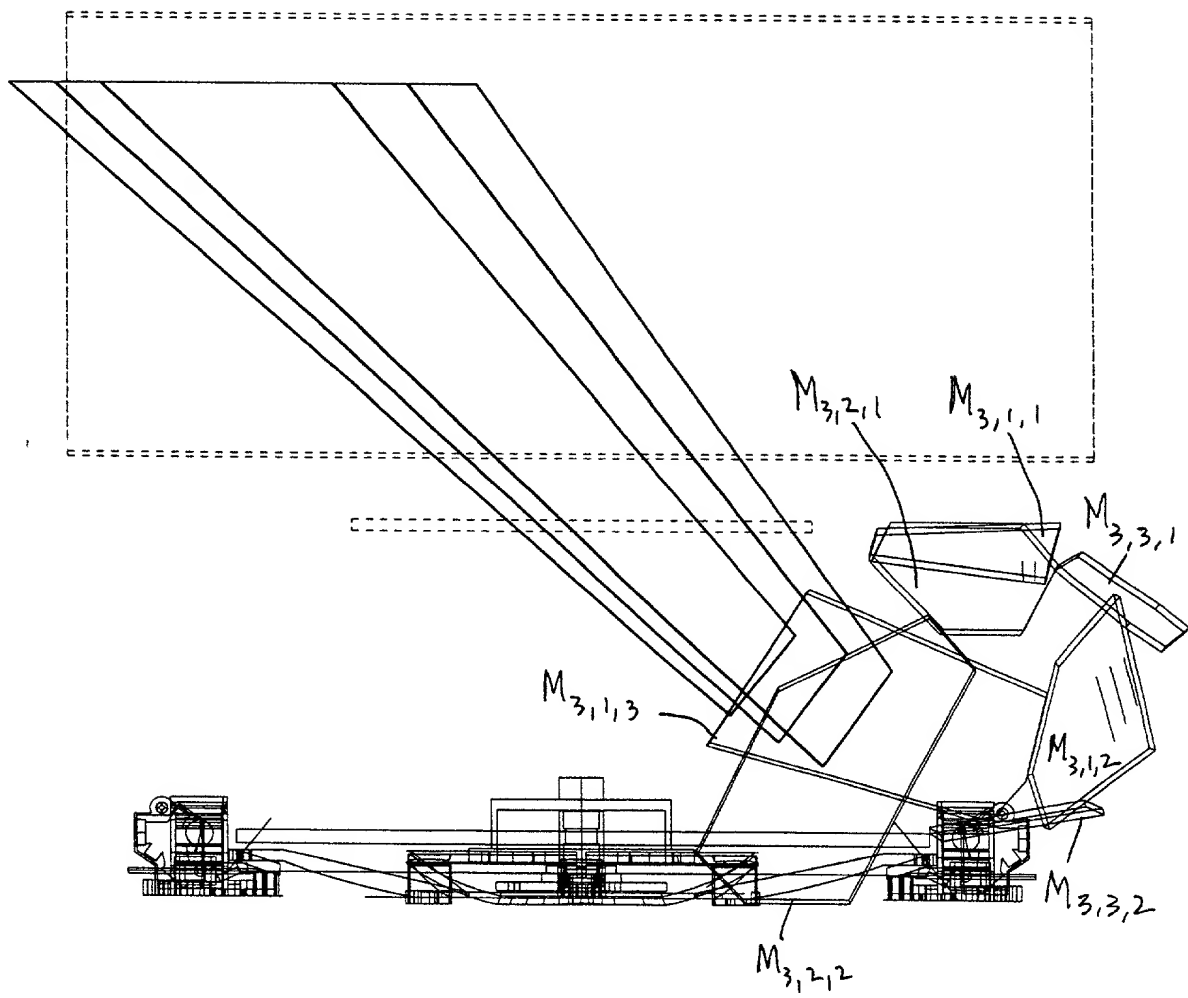


FIG. 5N3

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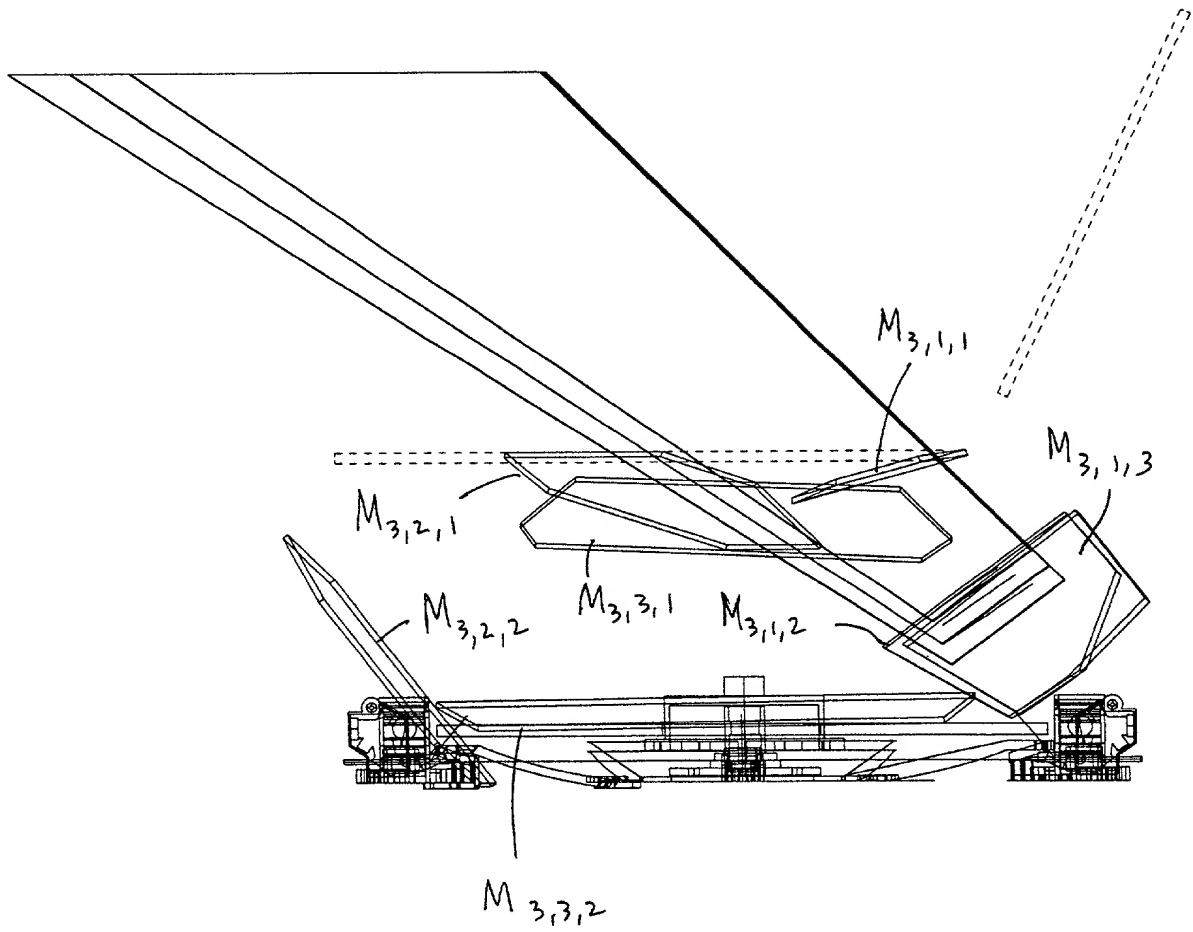


FIG. 5N4

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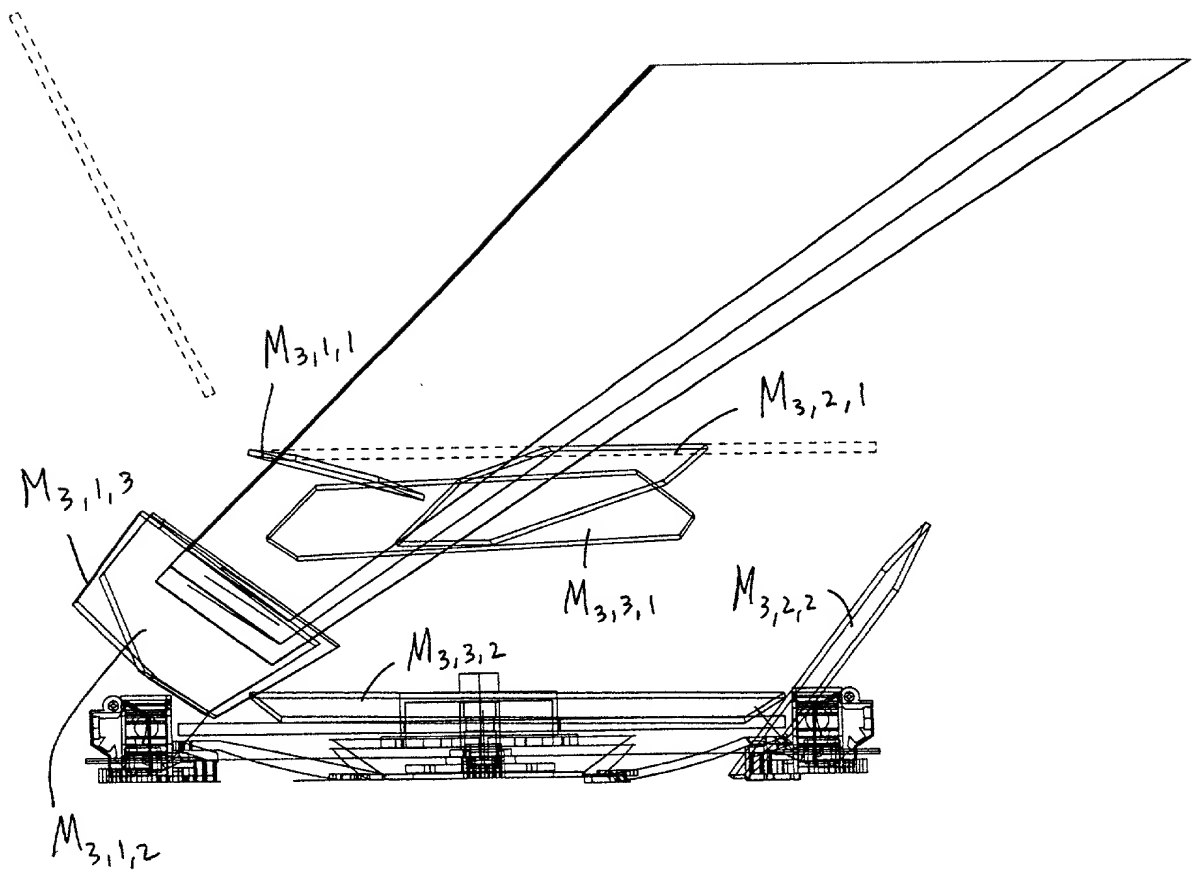


FIG. 5N5

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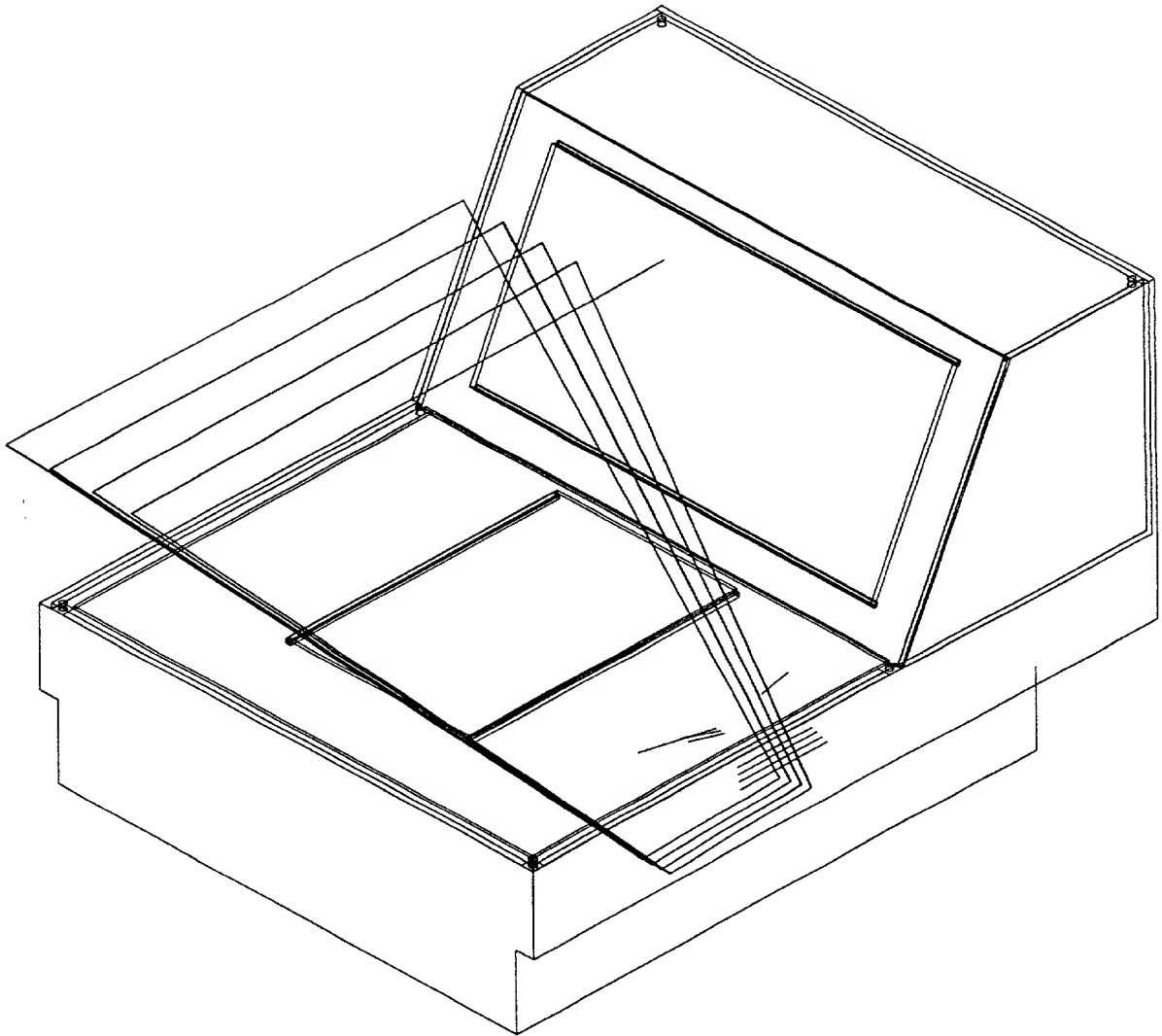


FIG. 501

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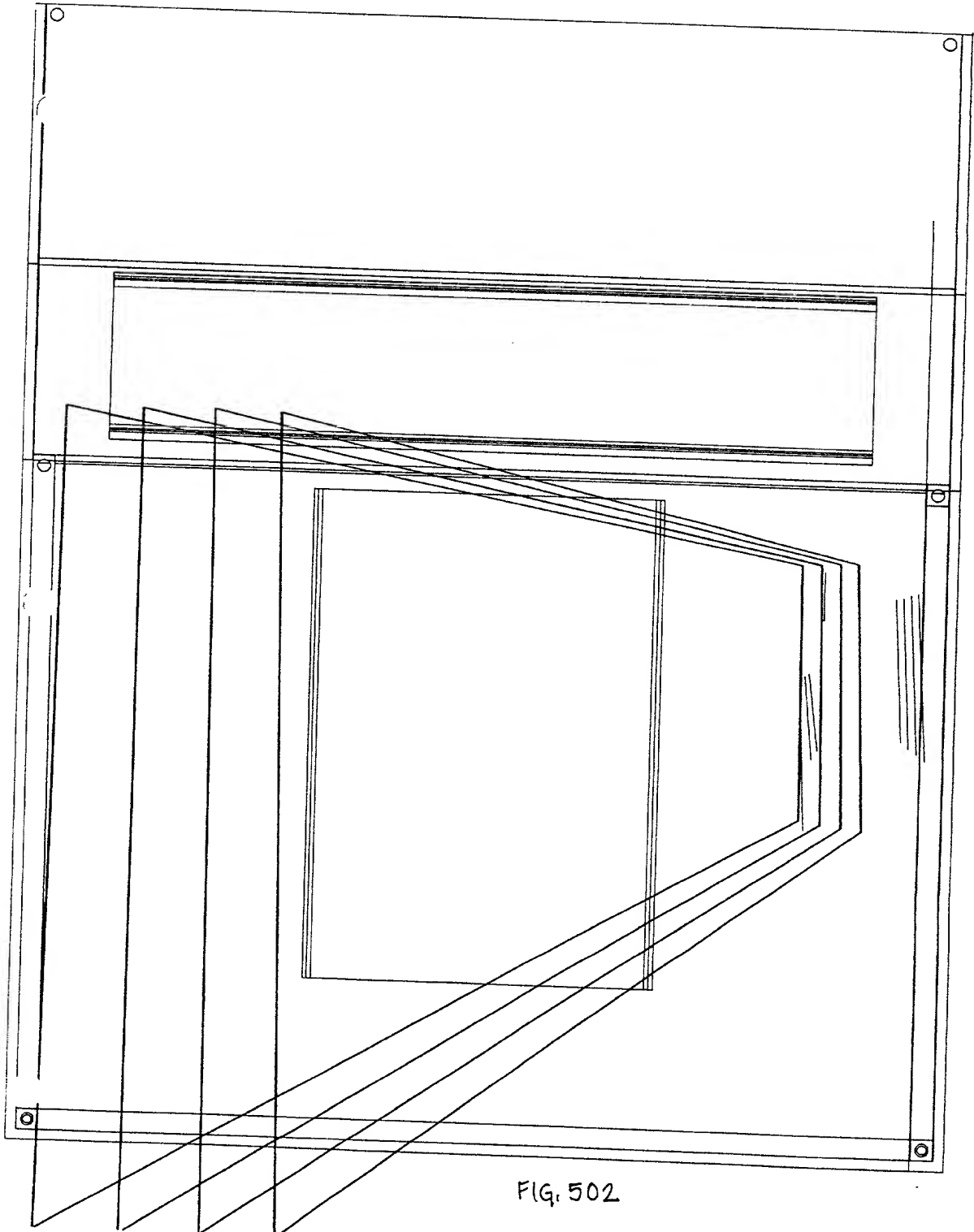


FIG. 502

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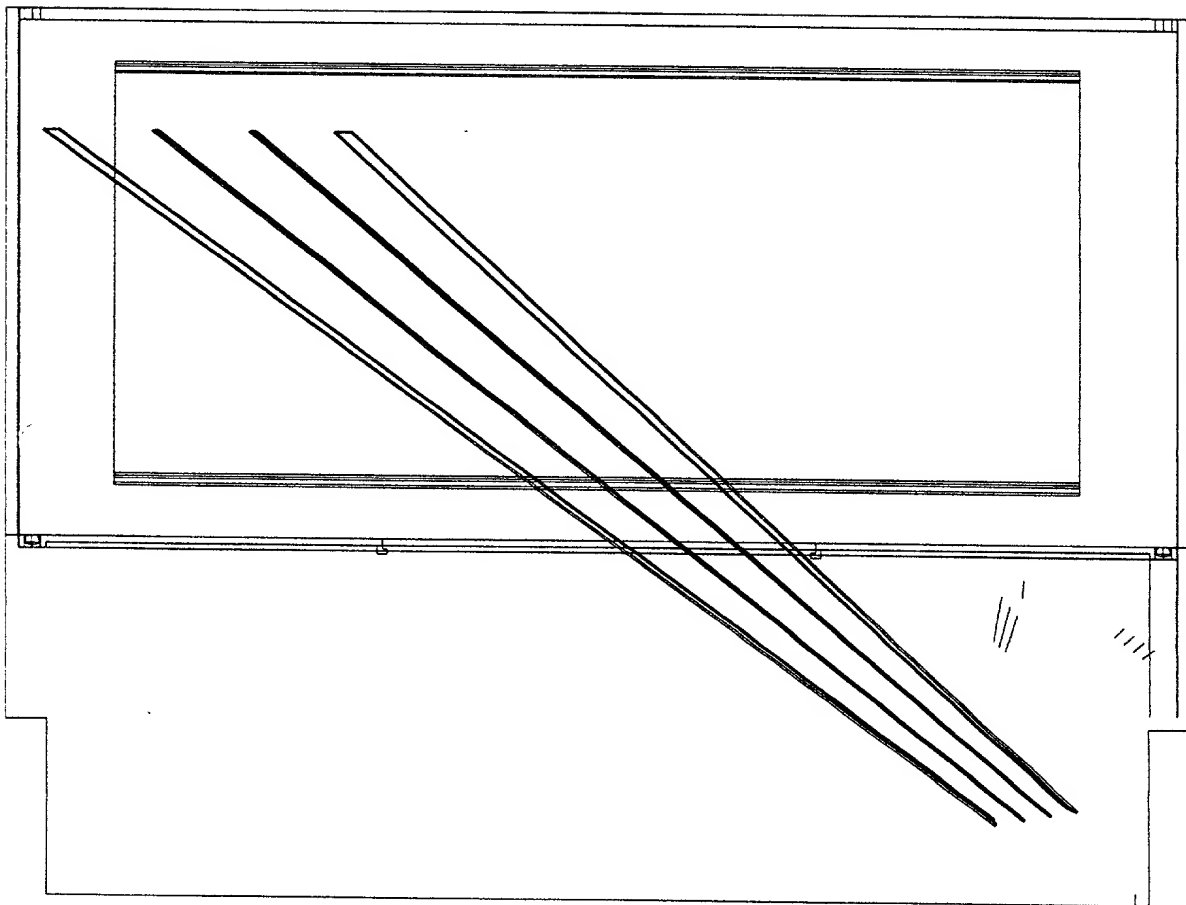


FIG. 503

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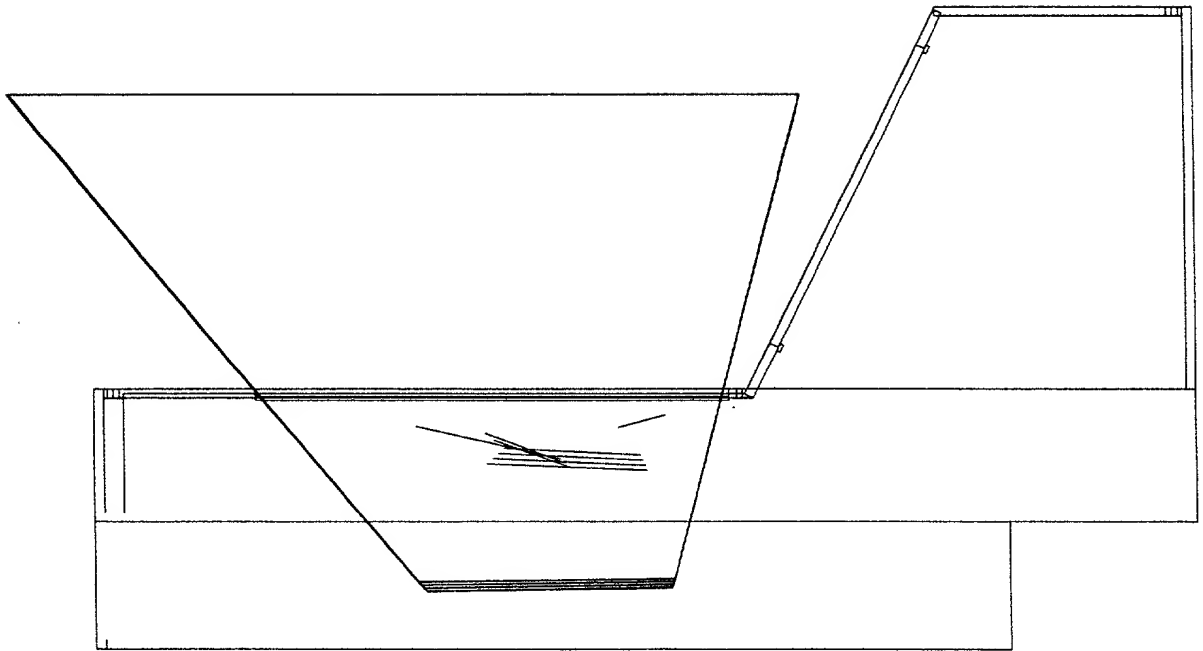


FIG. 504

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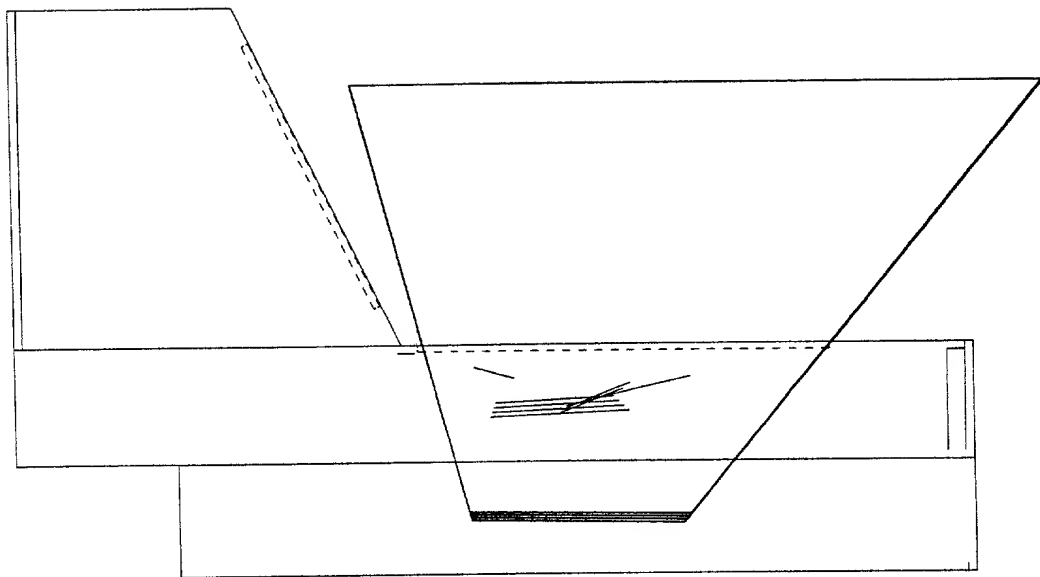


FIG. 505

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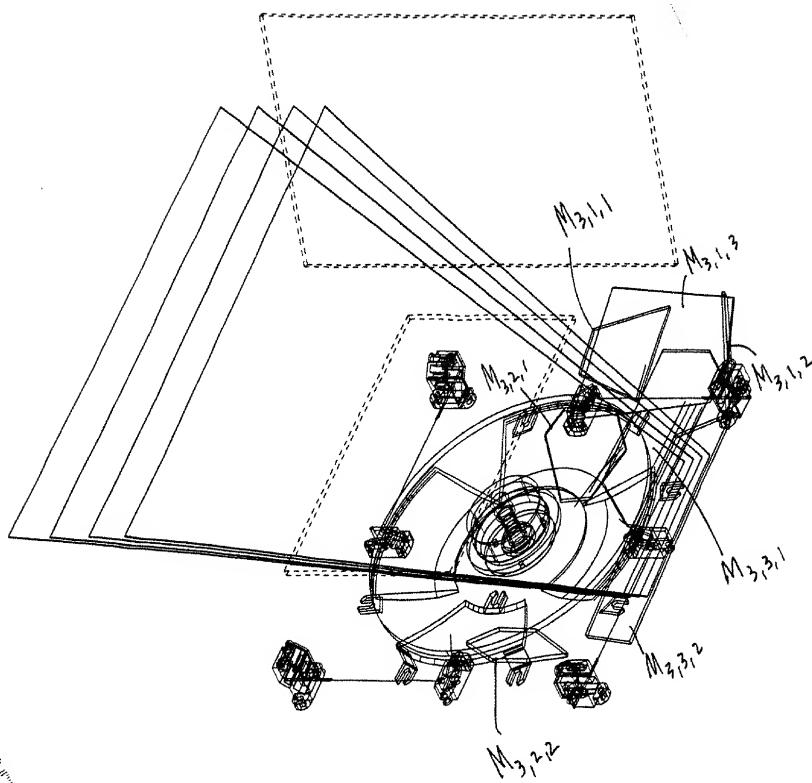


FIG. 581

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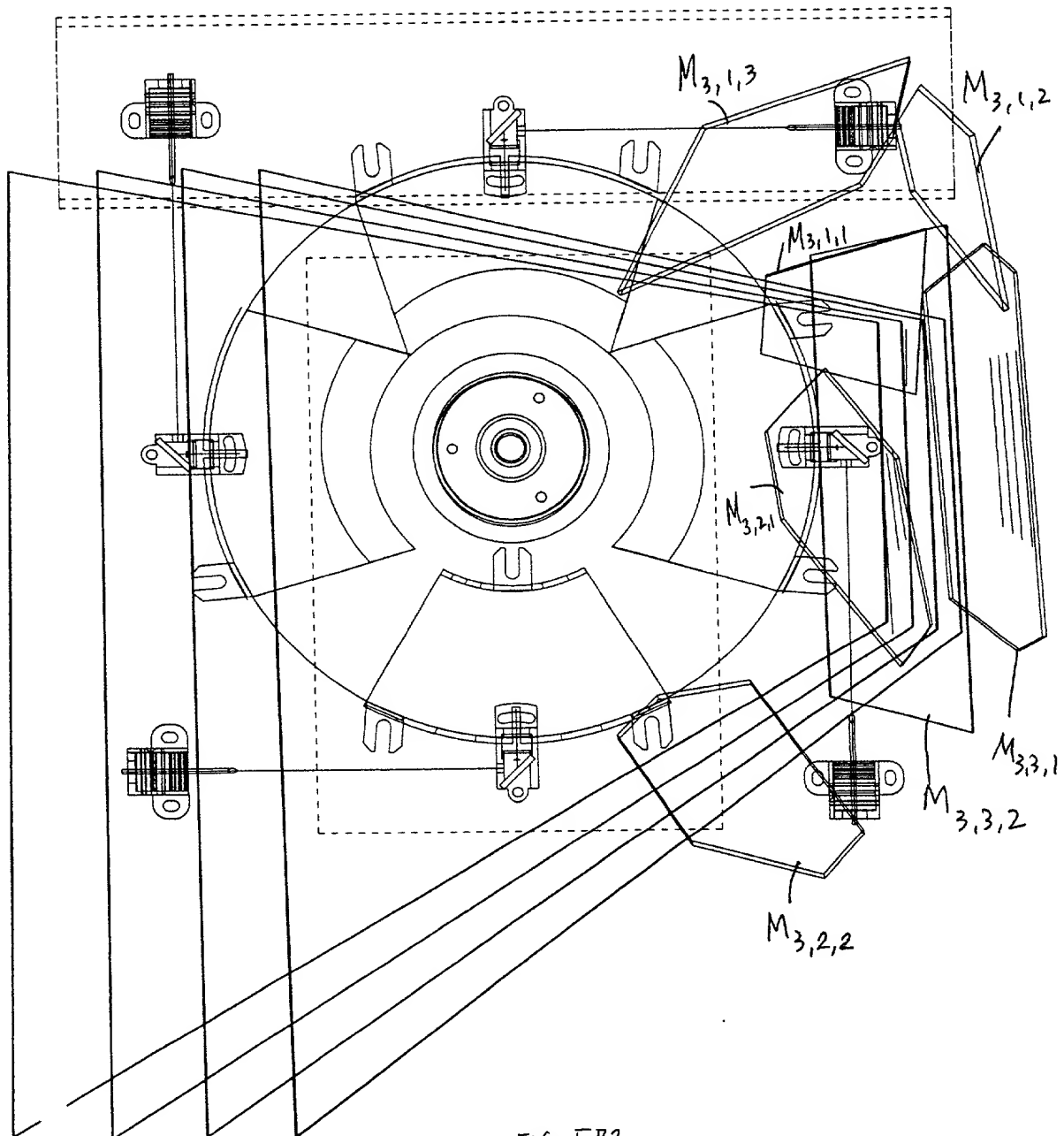


FIG. 5P2

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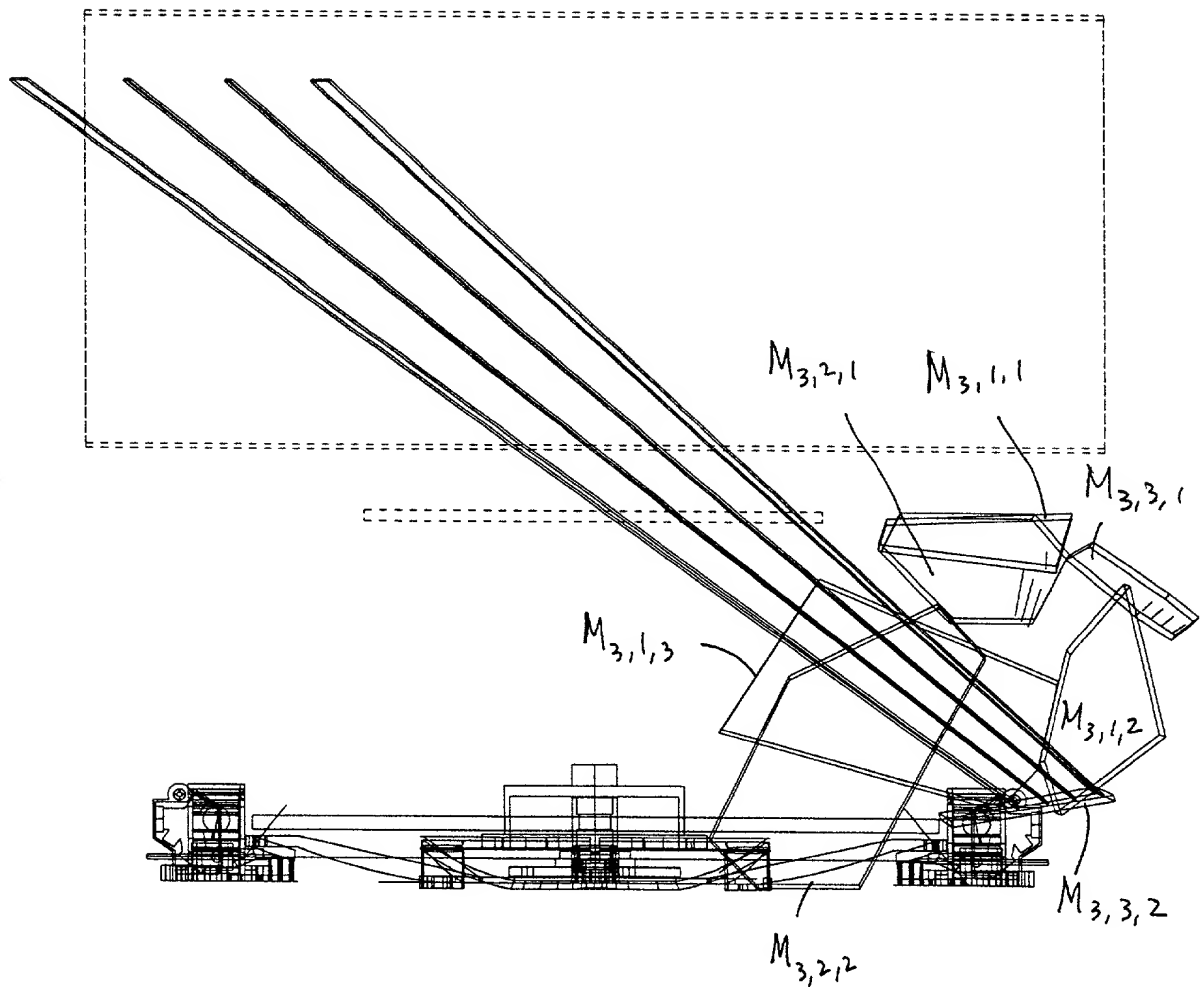


FIG. 5P3

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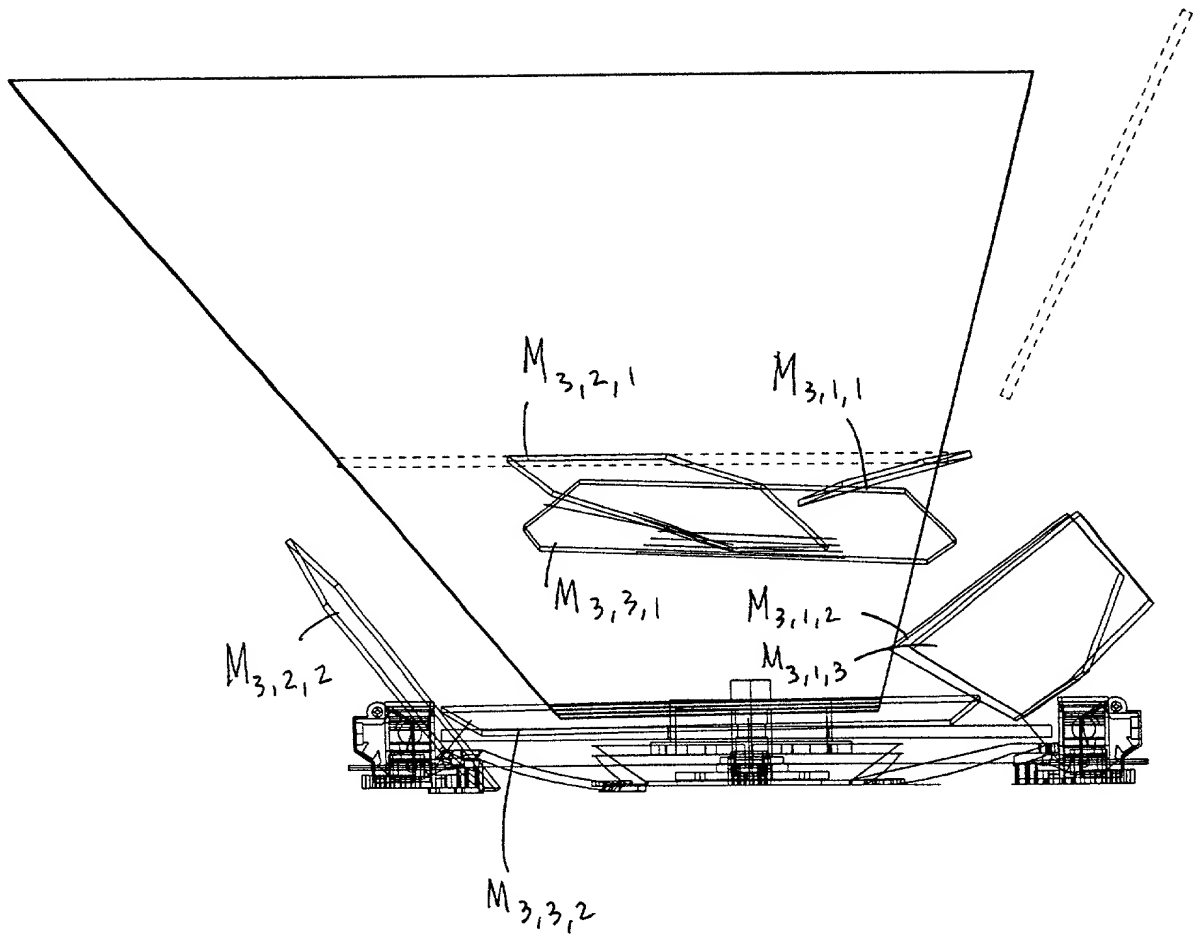


FIG. 5P4

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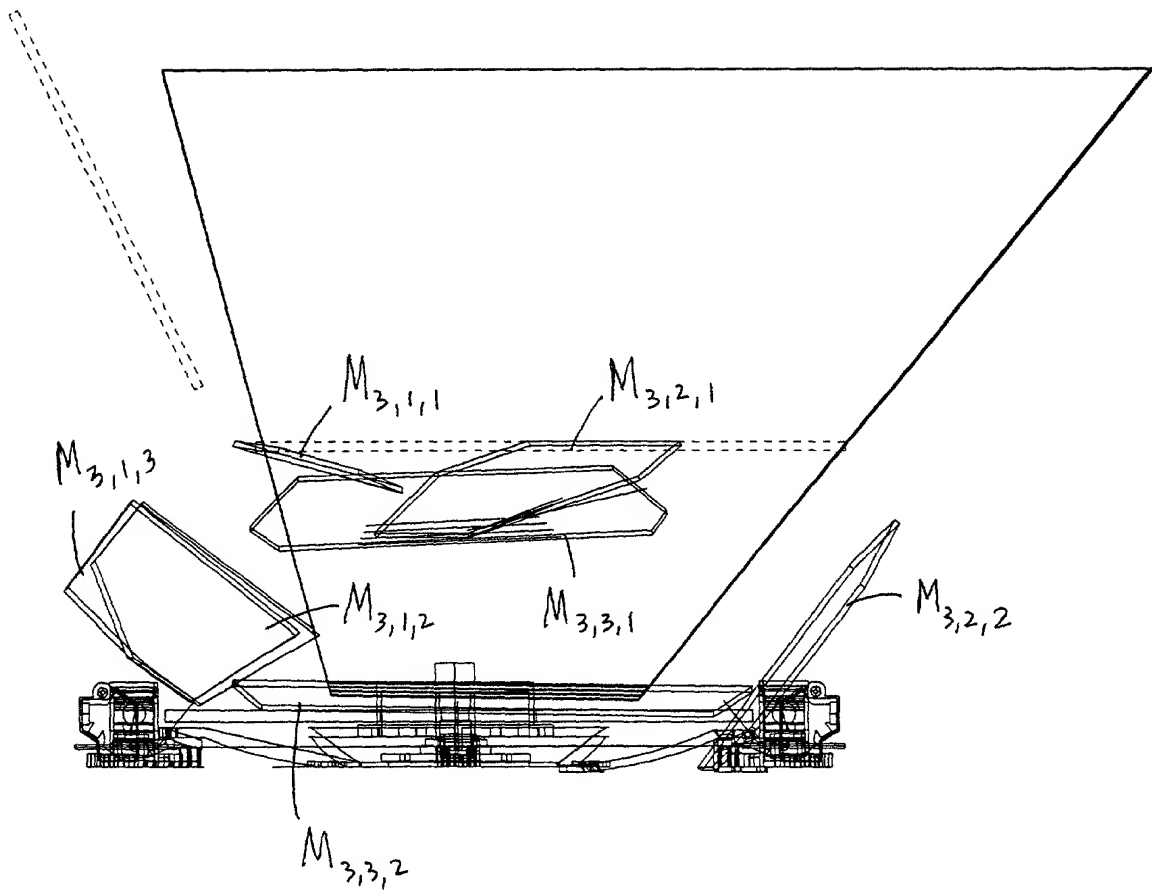


FIG. 5P5

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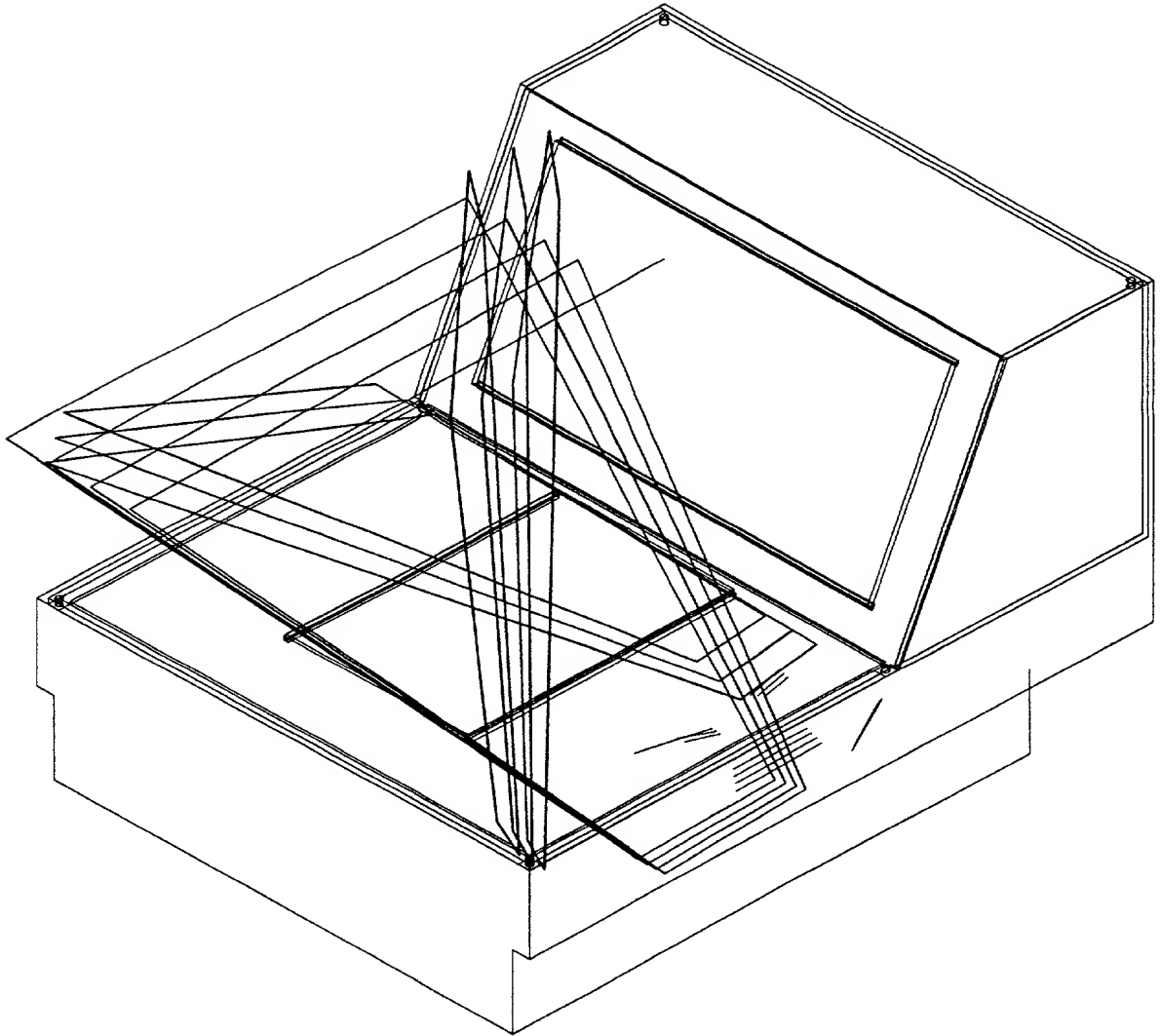


FIG. 5Q1

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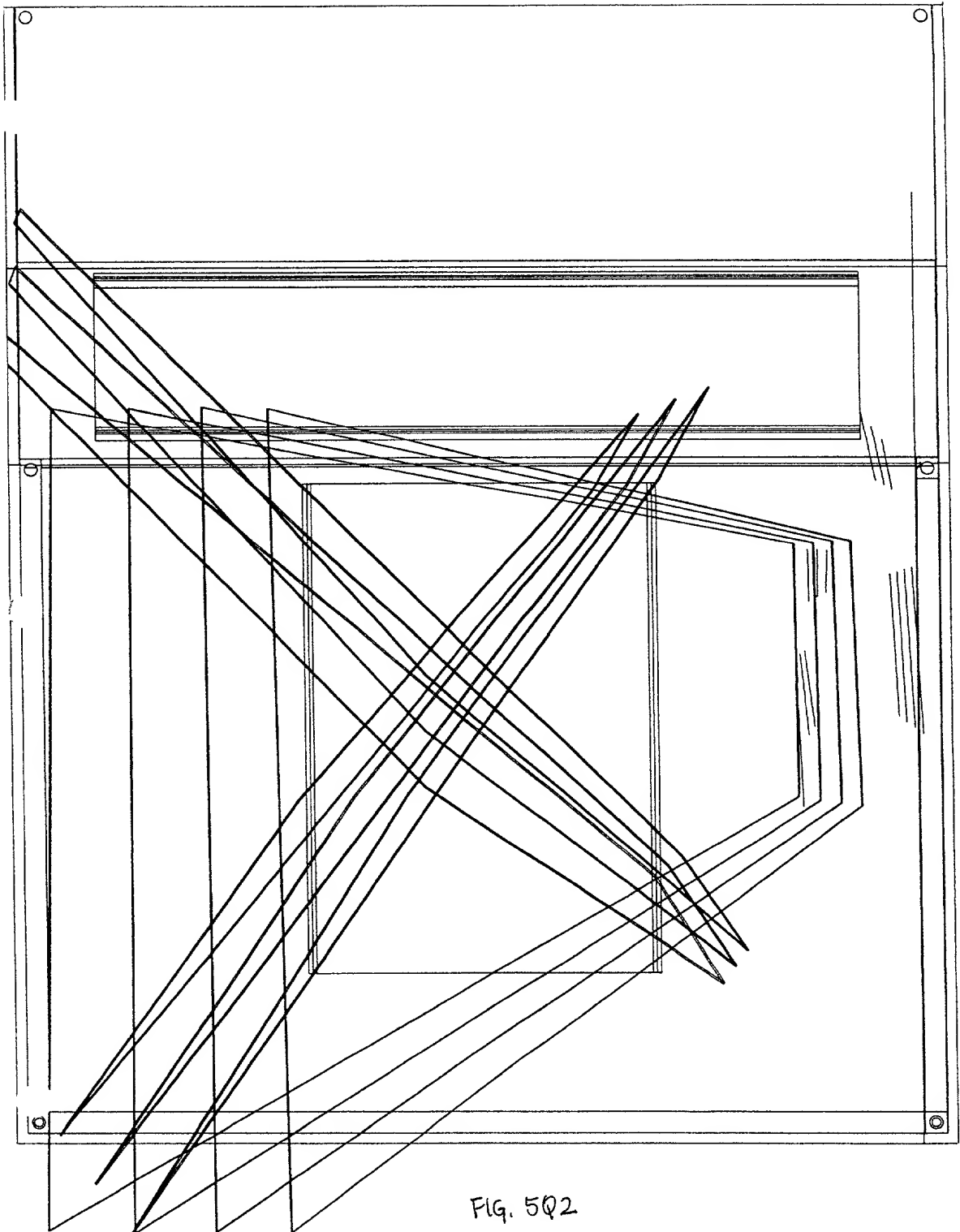


FIG. 5Q2

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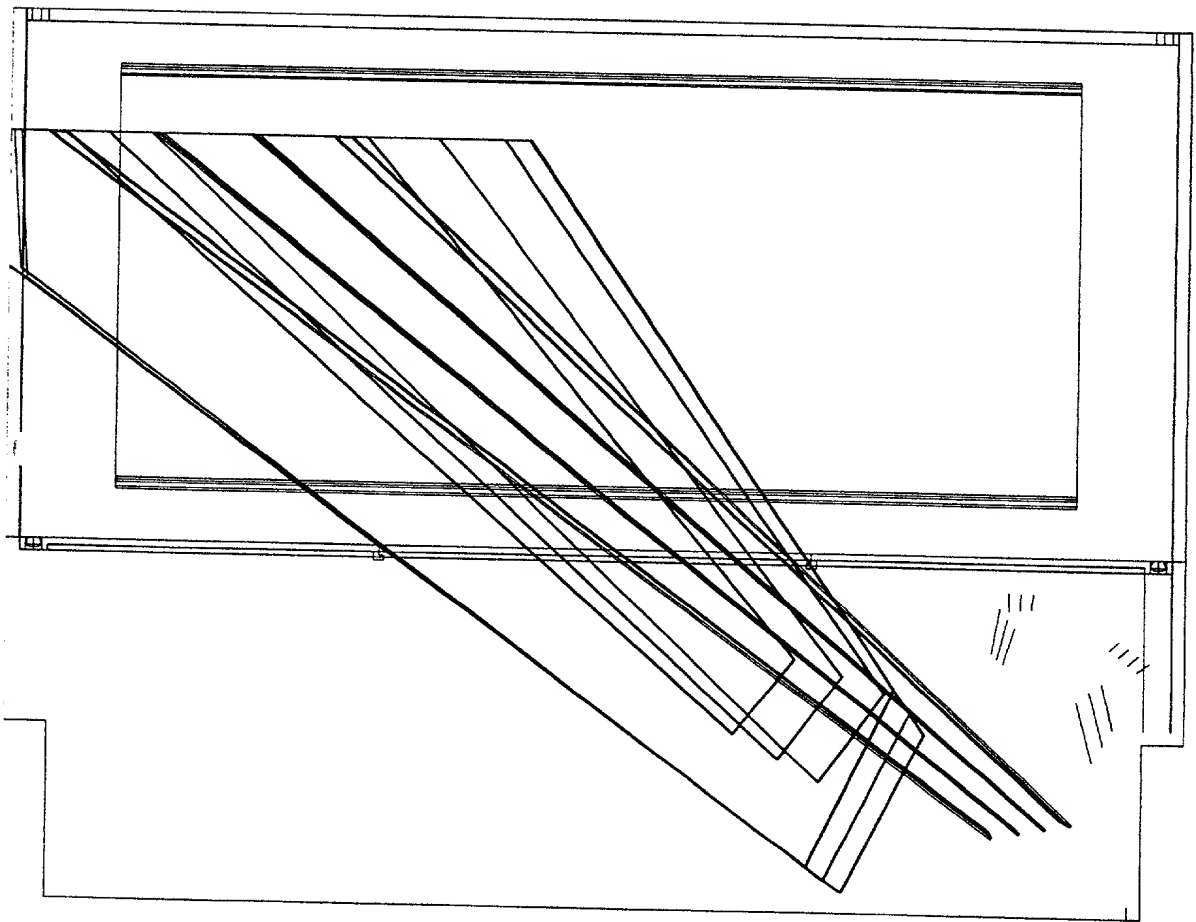


FIG. 5 Q3

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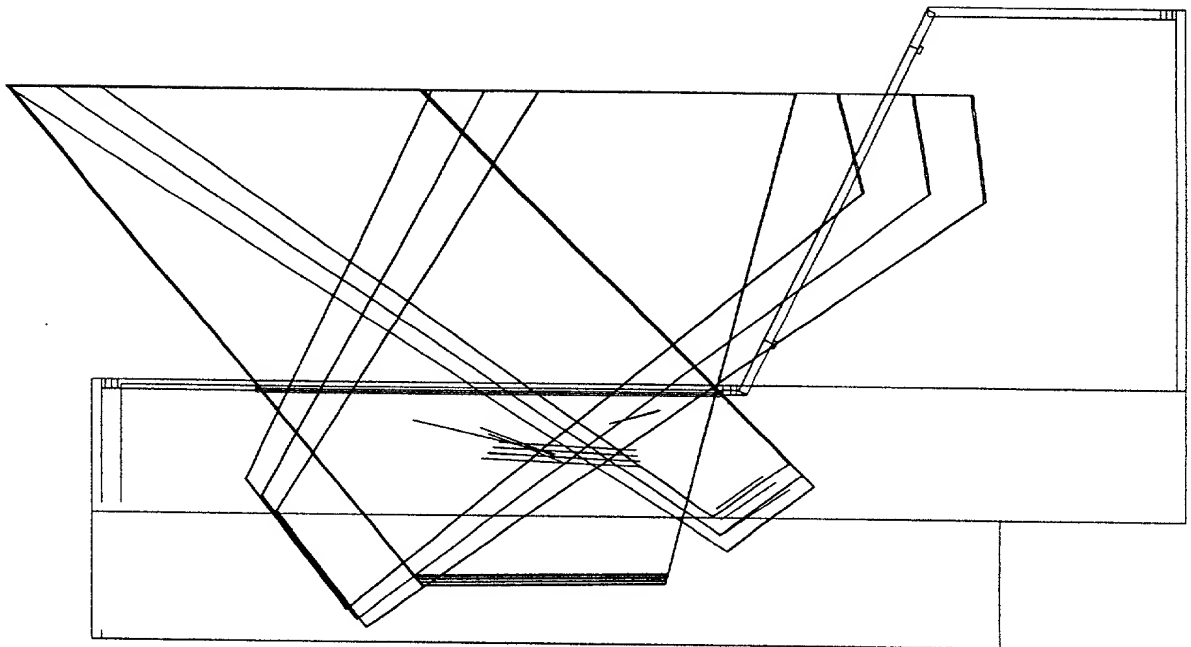


FIG. 5Q4

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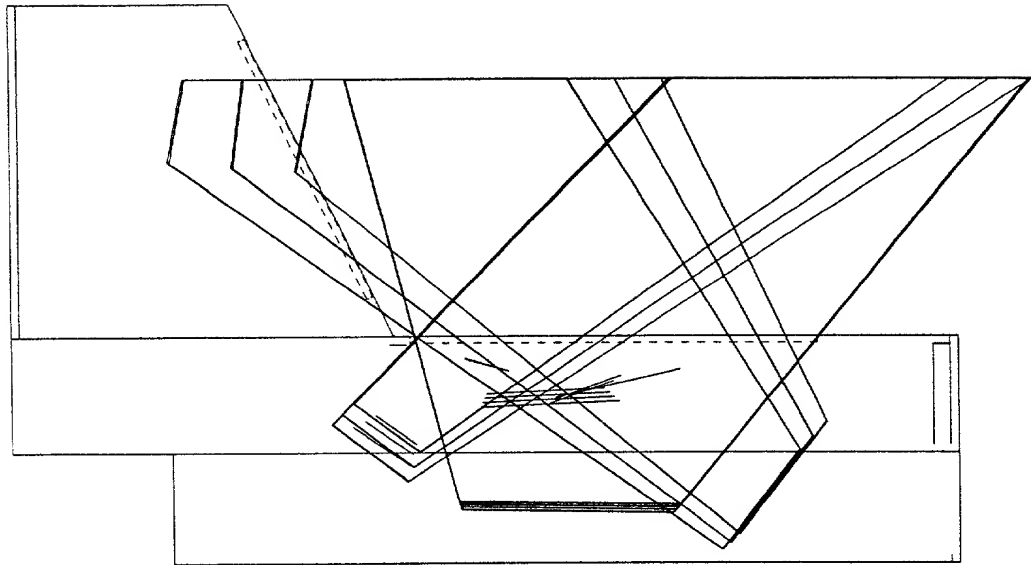


FIG. 5Q5

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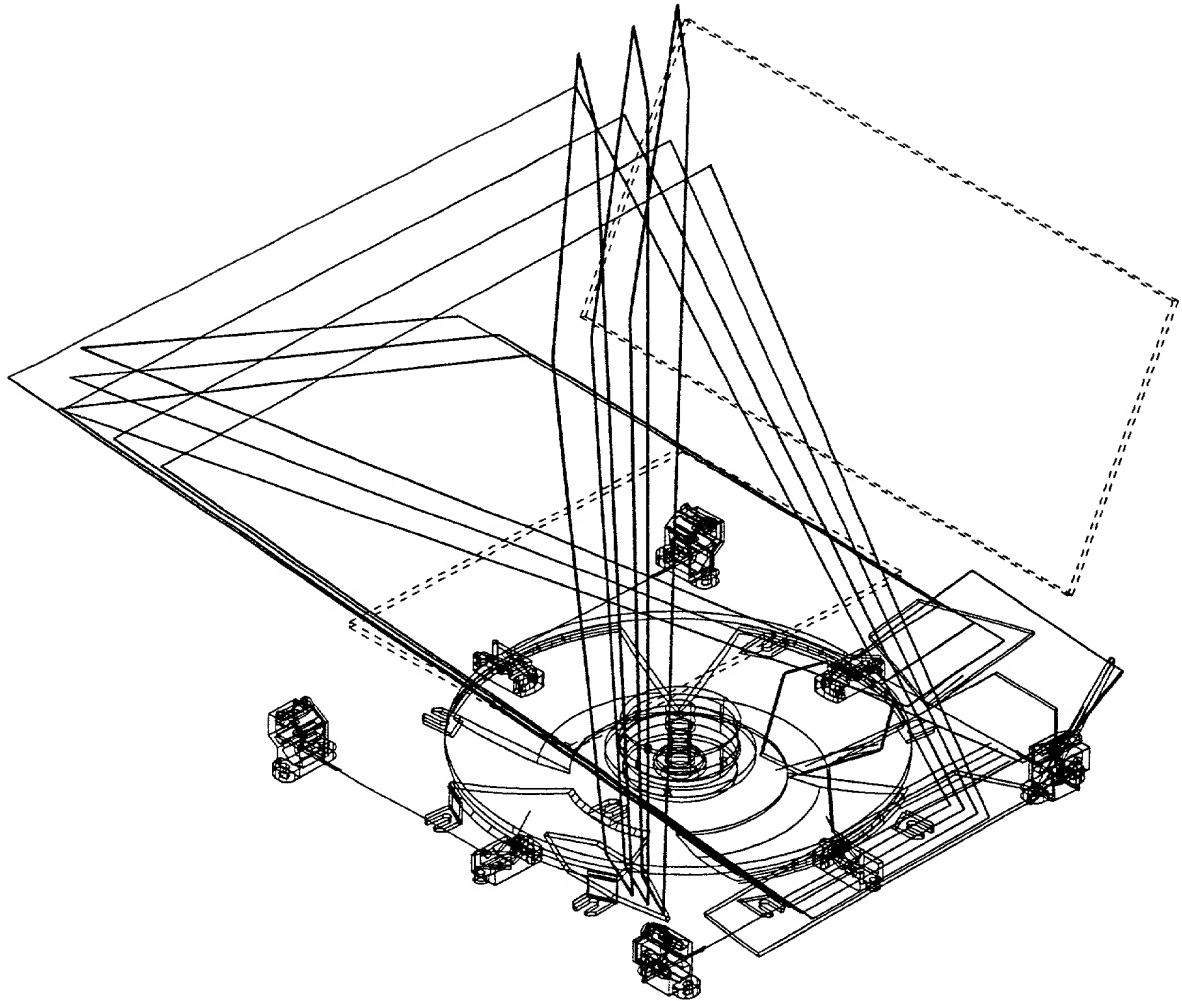


FIG. 5R1

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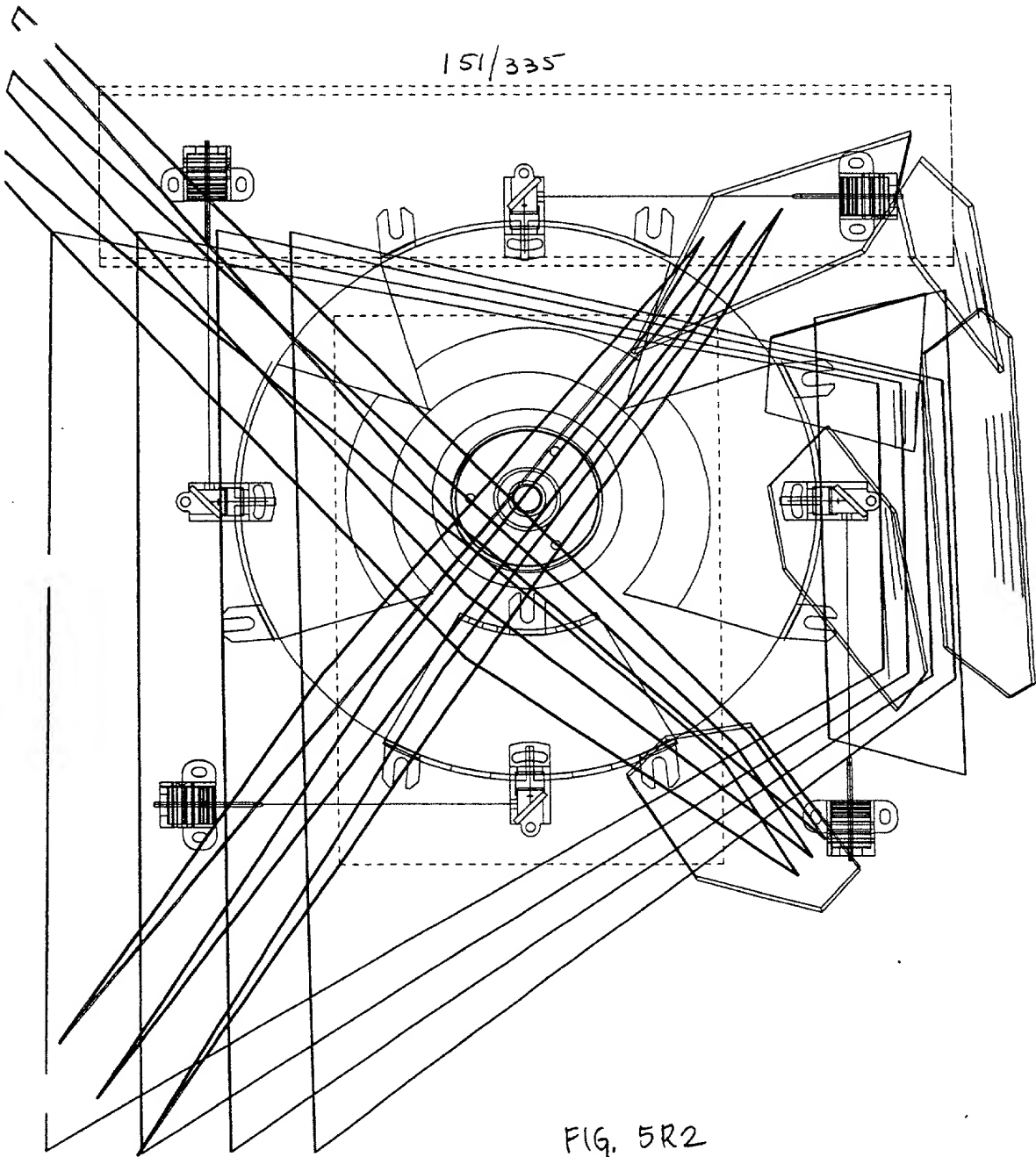


FIG. 5R2

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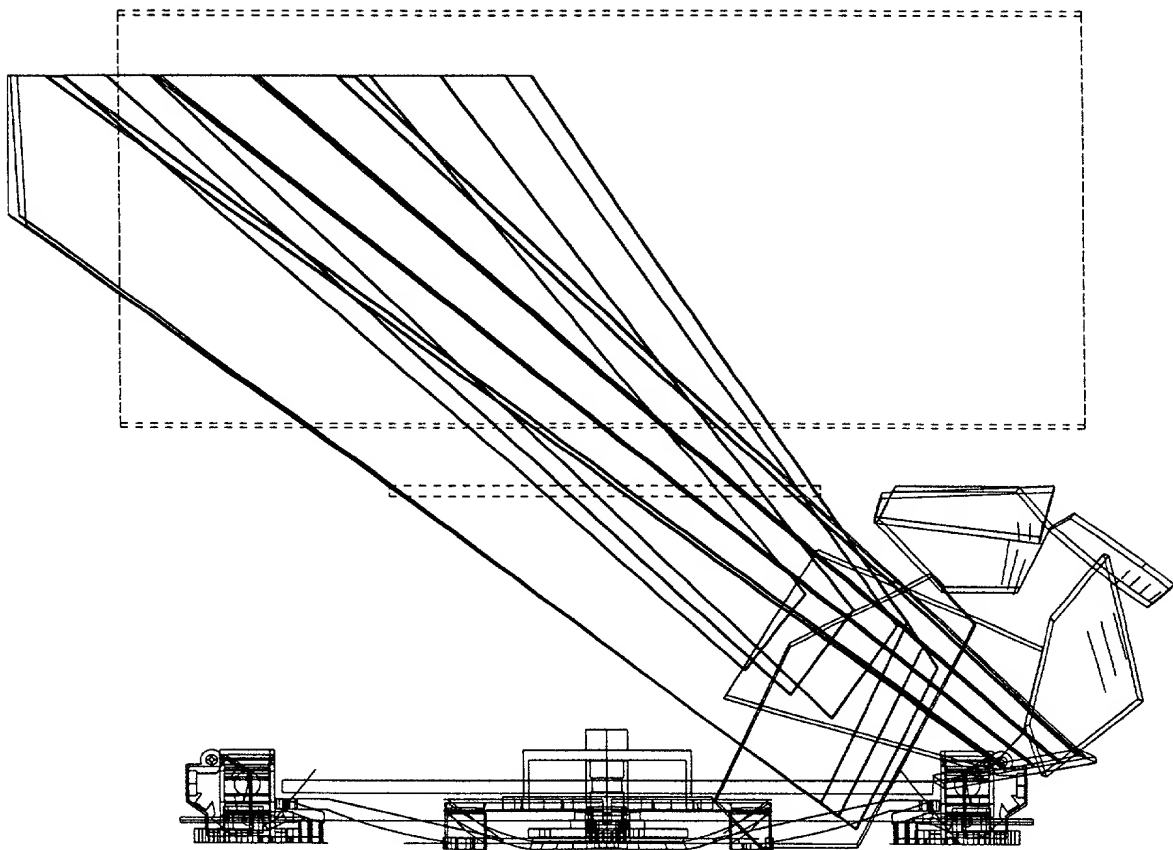


FIG. 5R3

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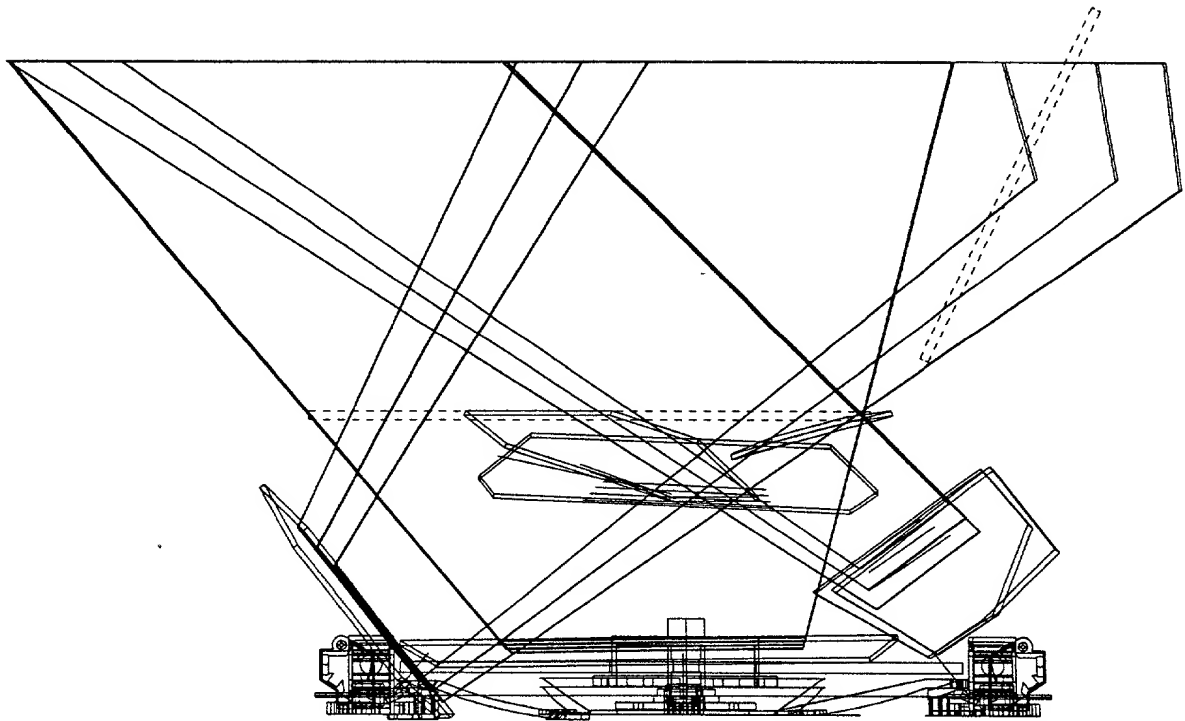


FIG. 5R4

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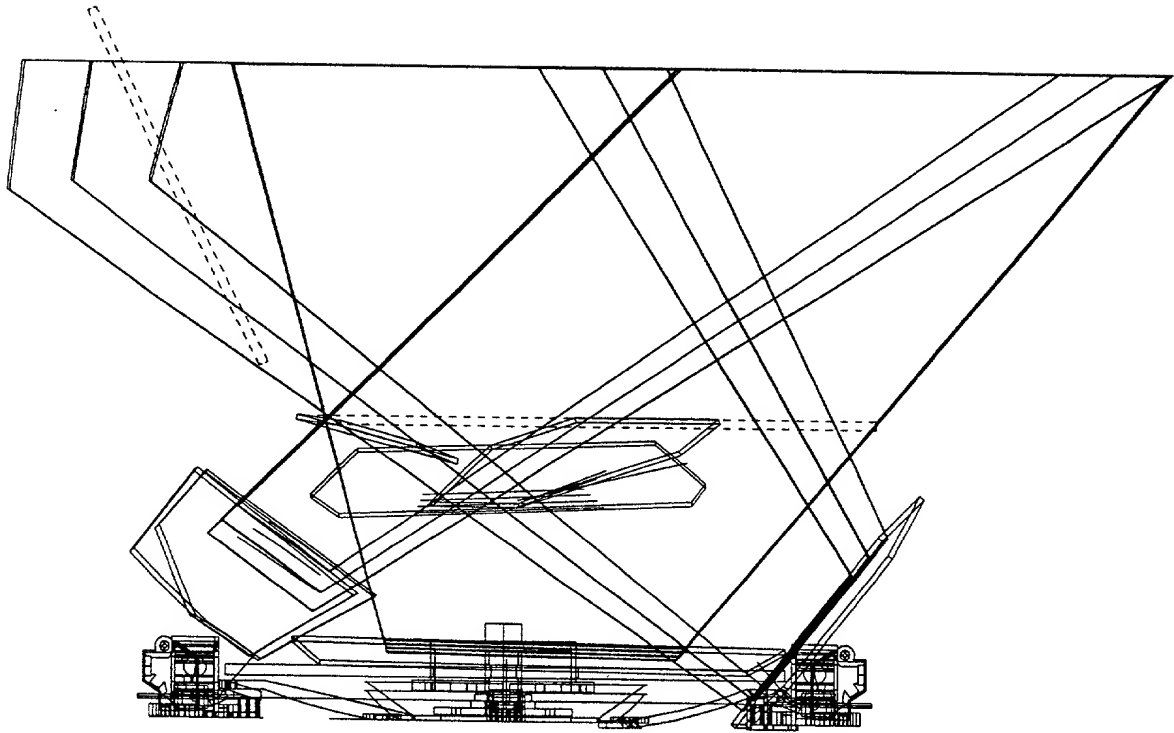


FIG. 5R5

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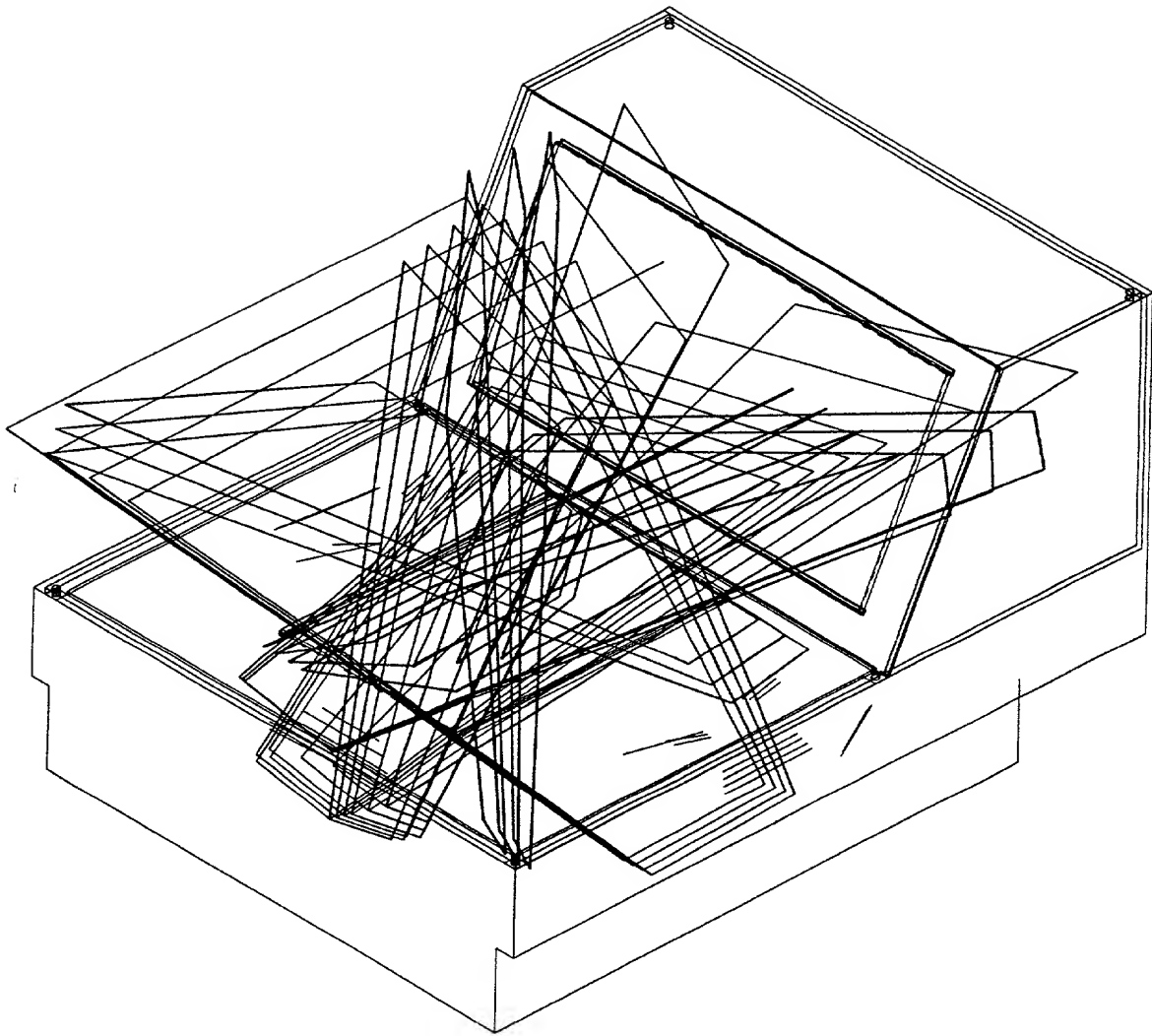


Fig. 581

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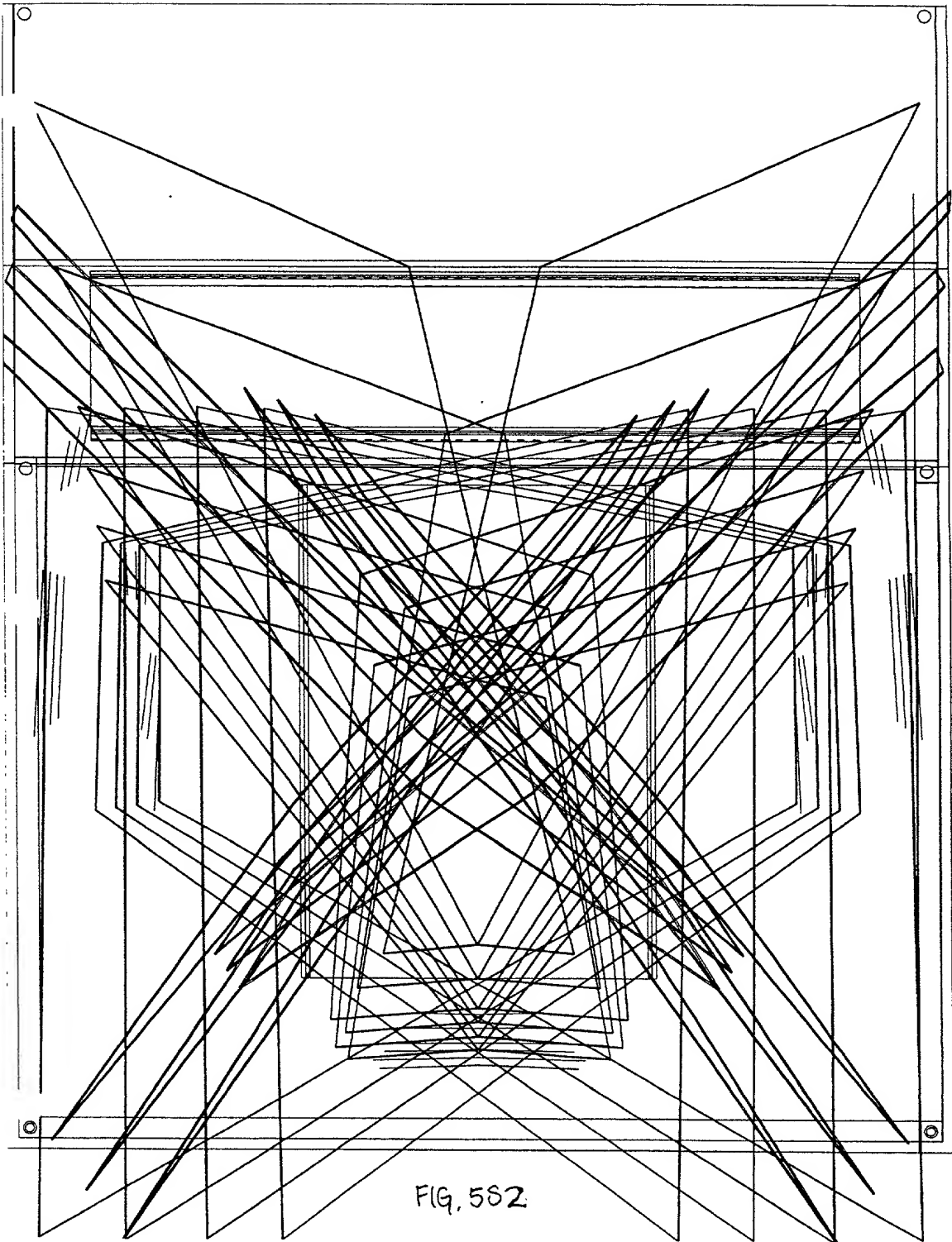


FIG. 582

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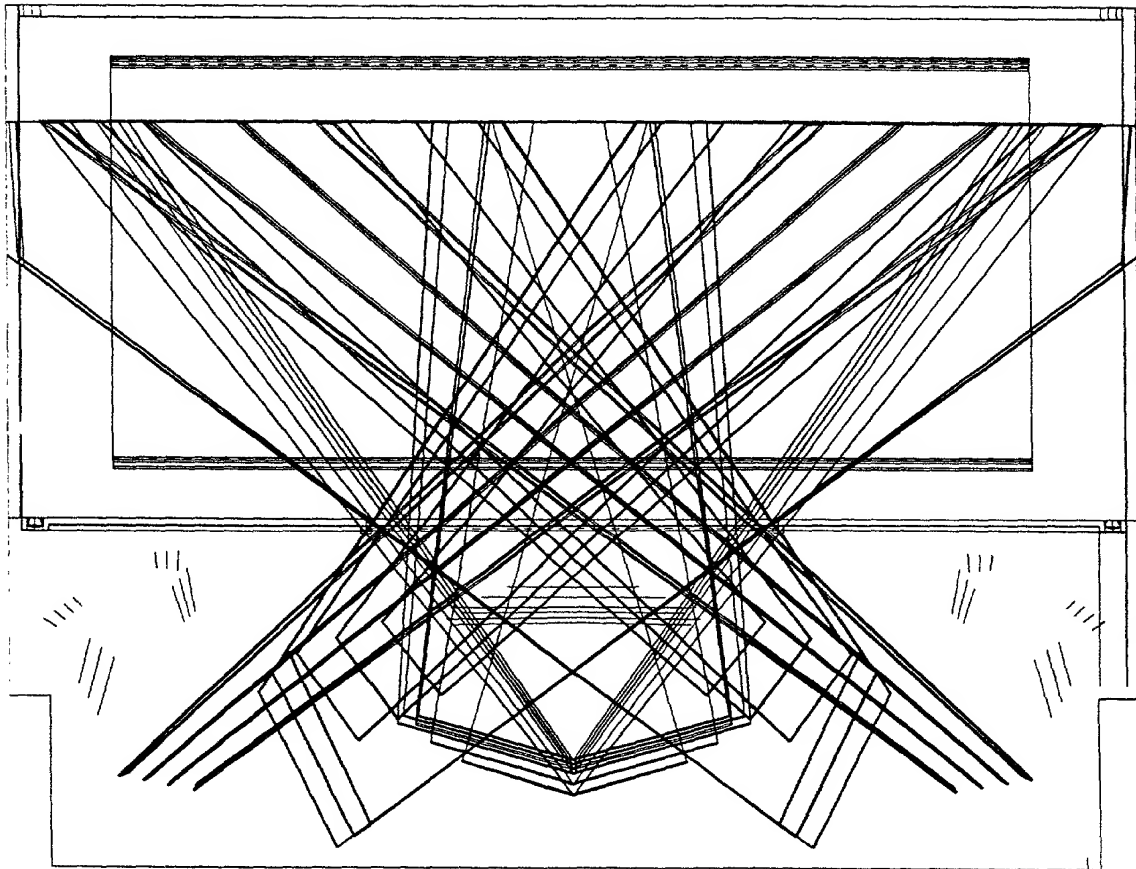


FIG. 553

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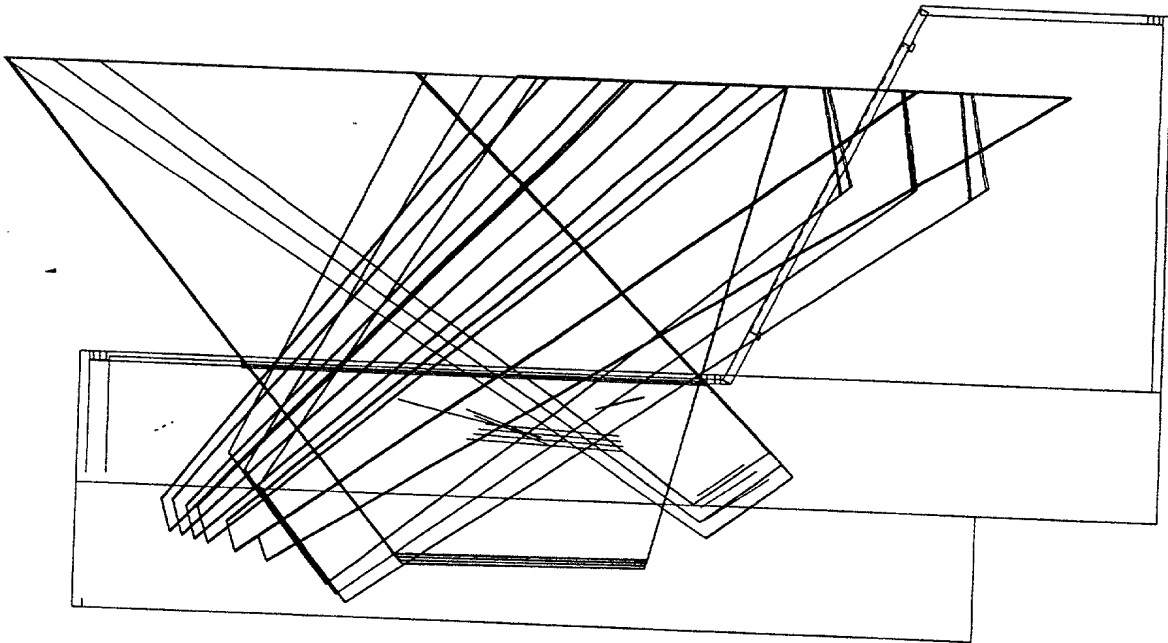


FIG. 584

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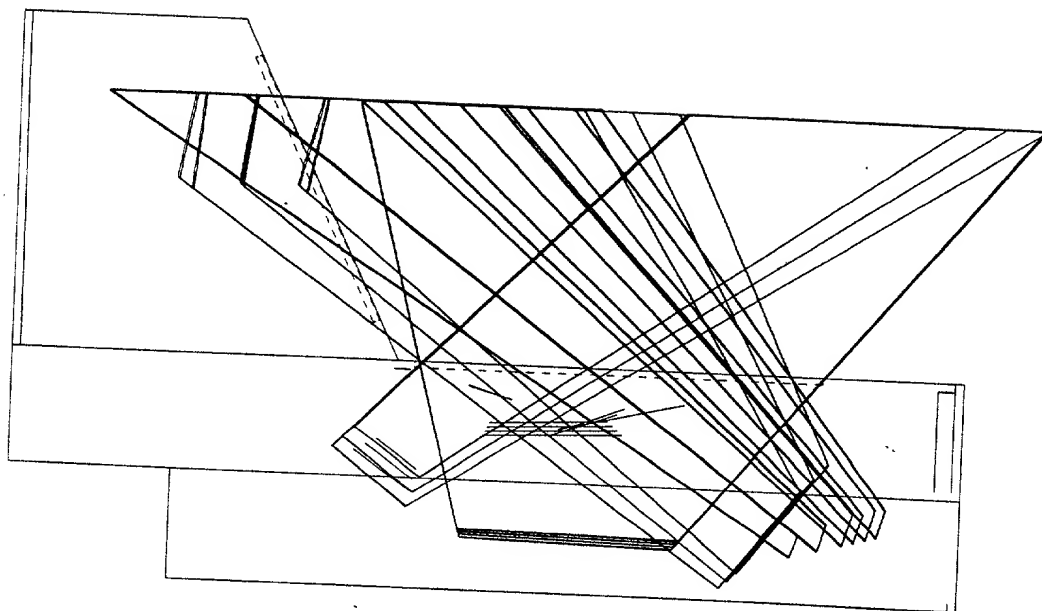


FIG. 585

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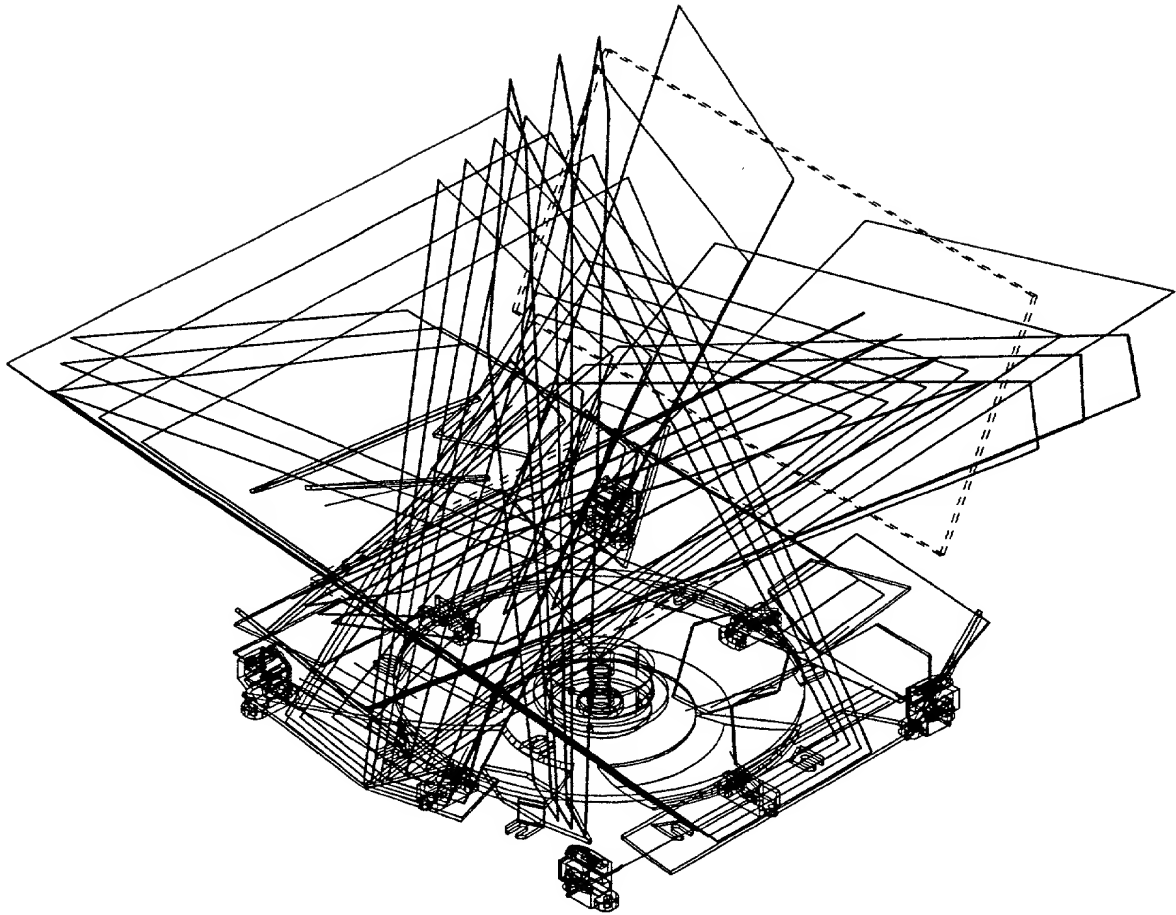


FIG. 5T1

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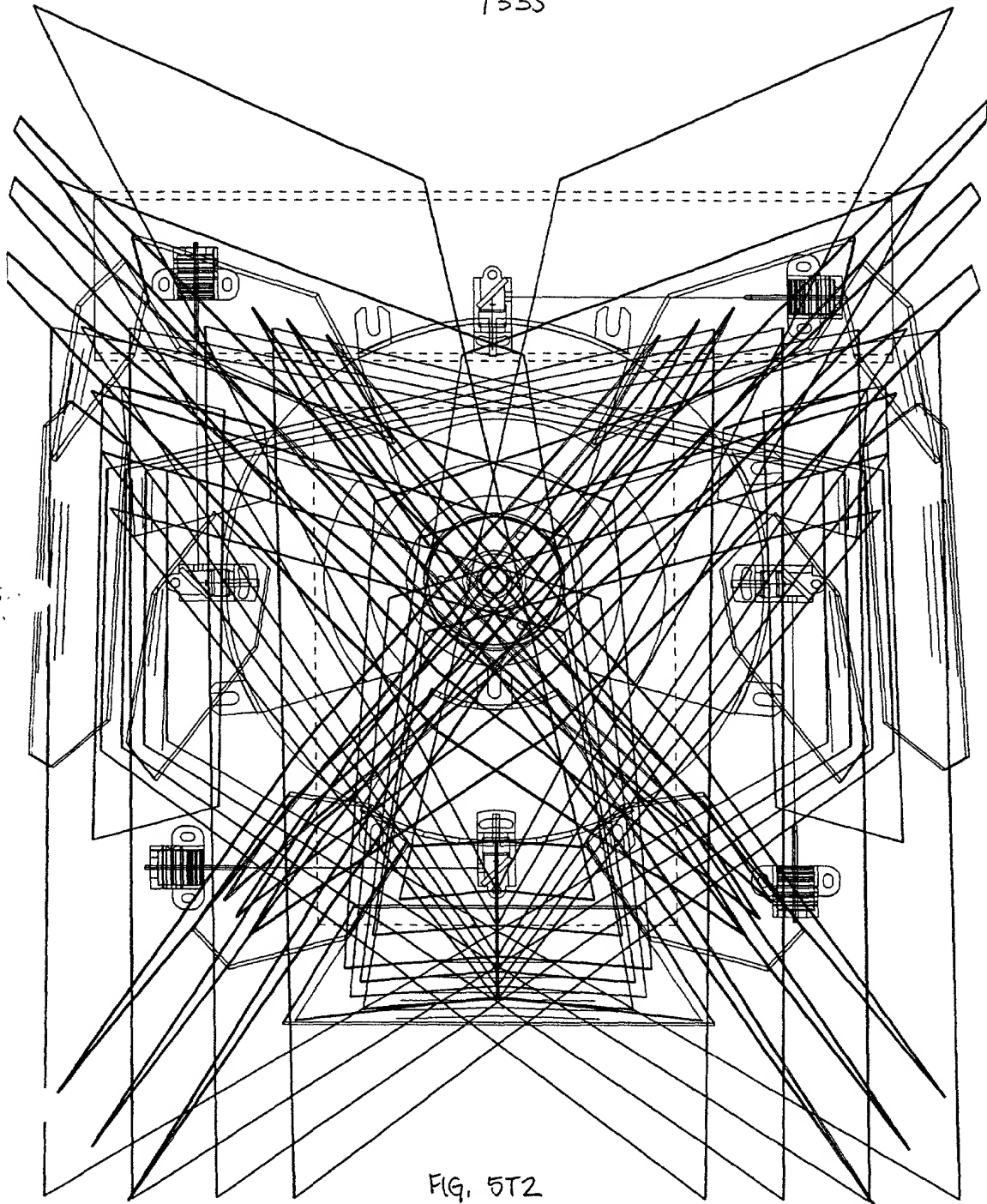


FIG. 5T2

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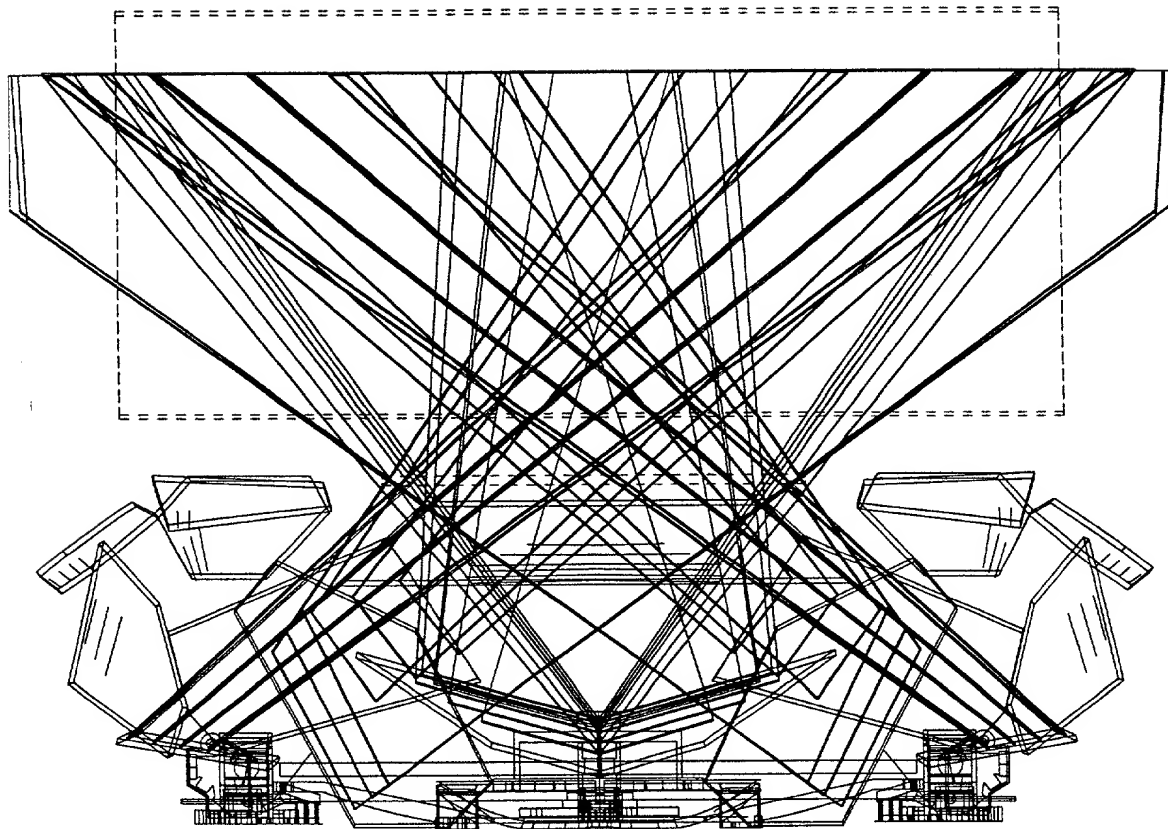


FIG. 5T3

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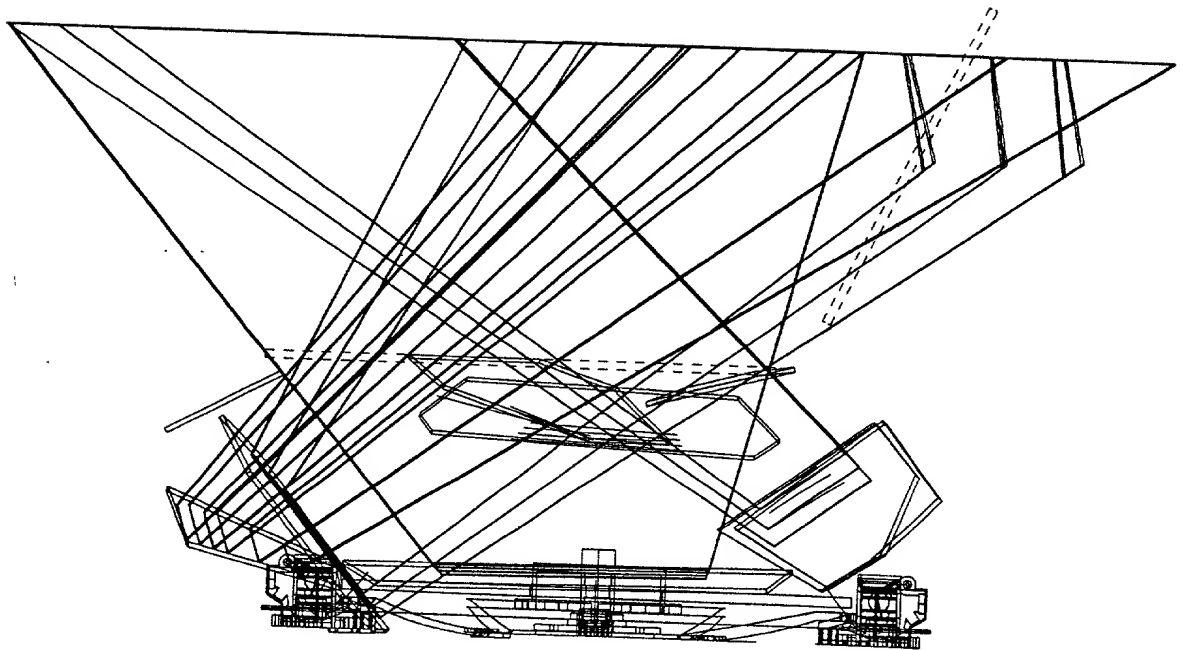


FIG. 5T4

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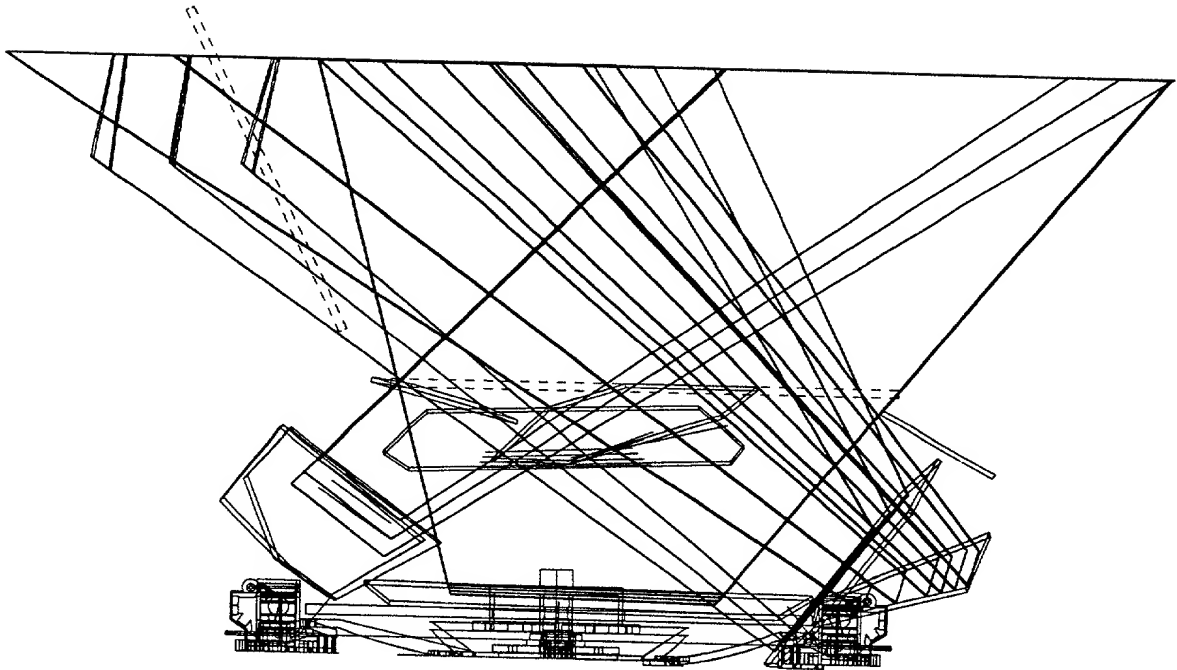


FIG. 5T5

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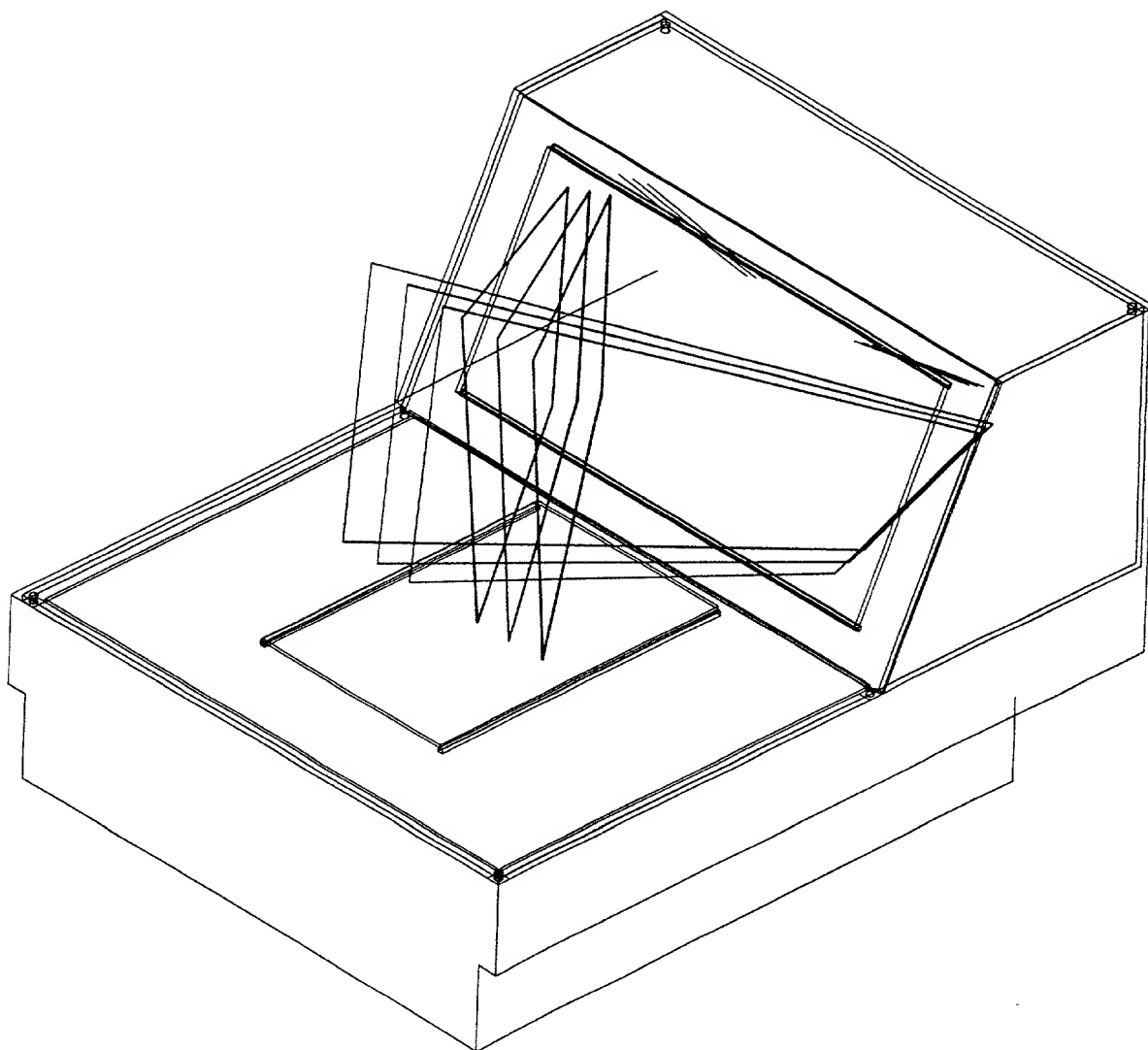


FIG. 5 U1

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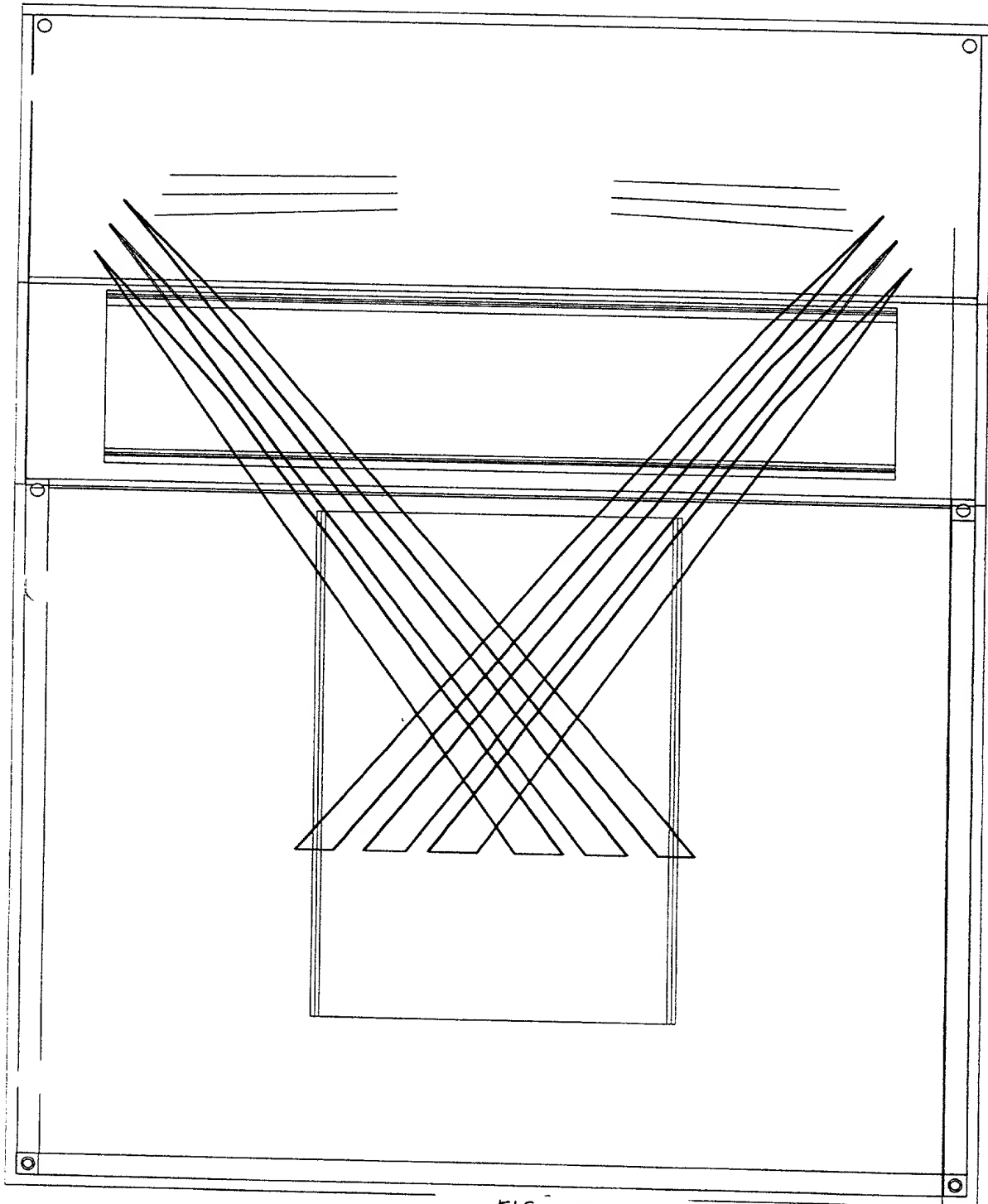


FIG. 5V2

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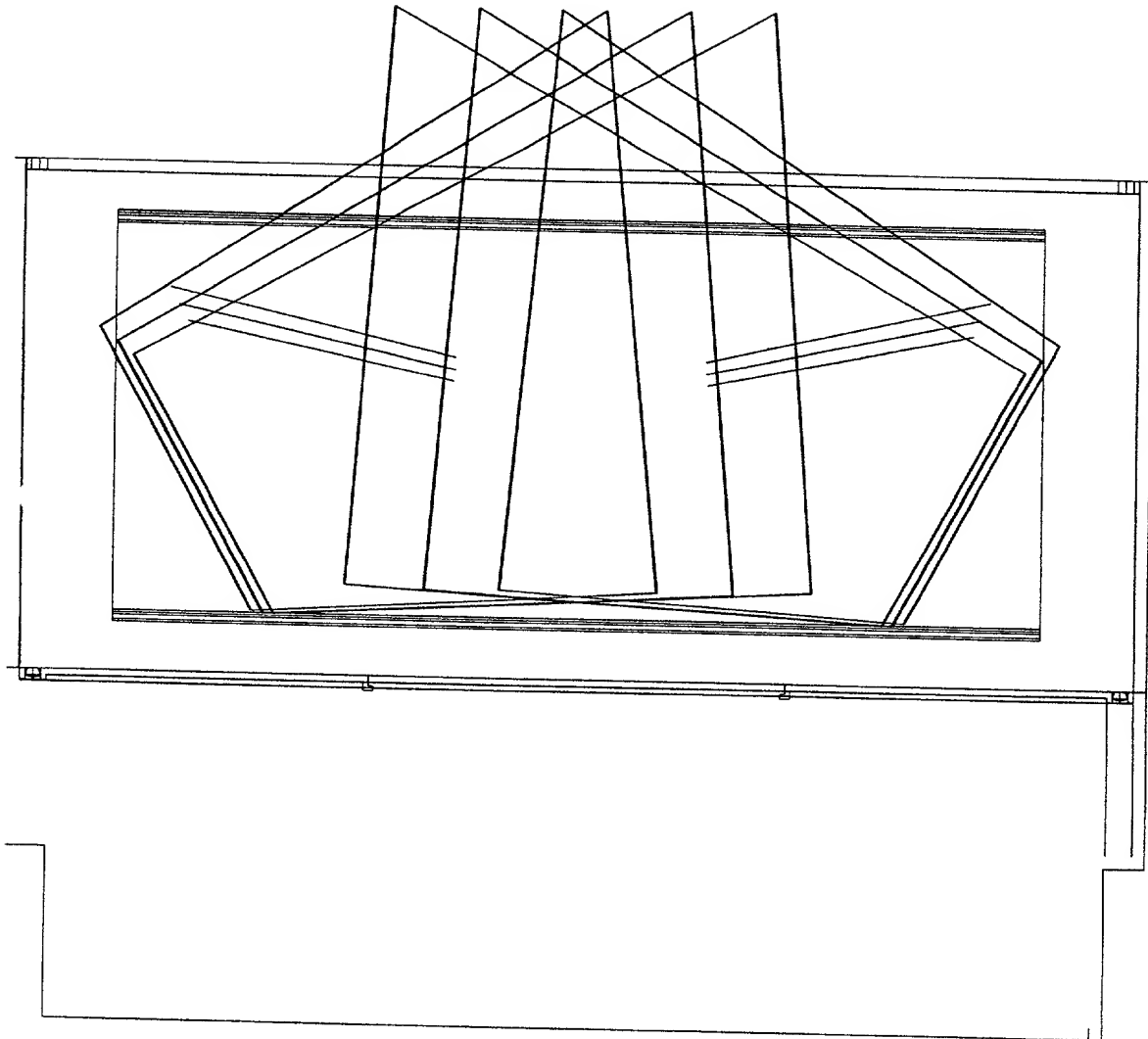


FIG. 5V3

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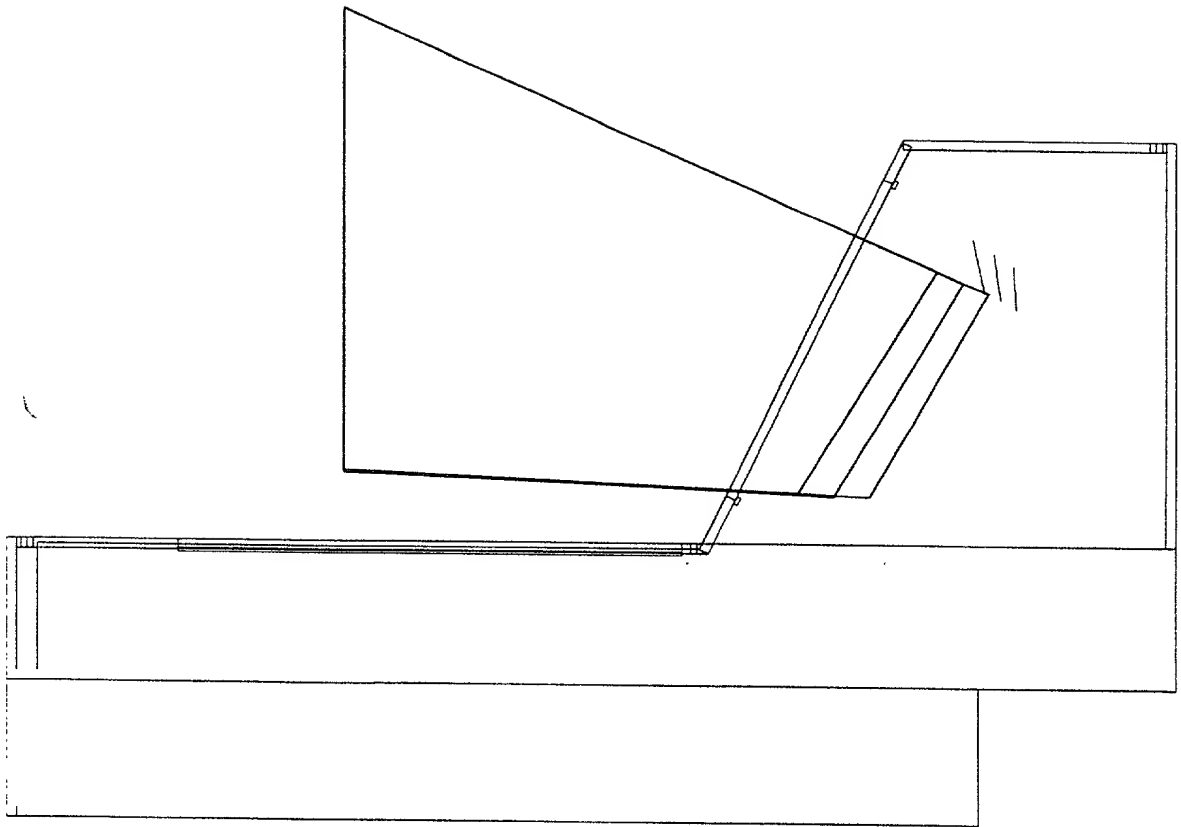


FIG. 504

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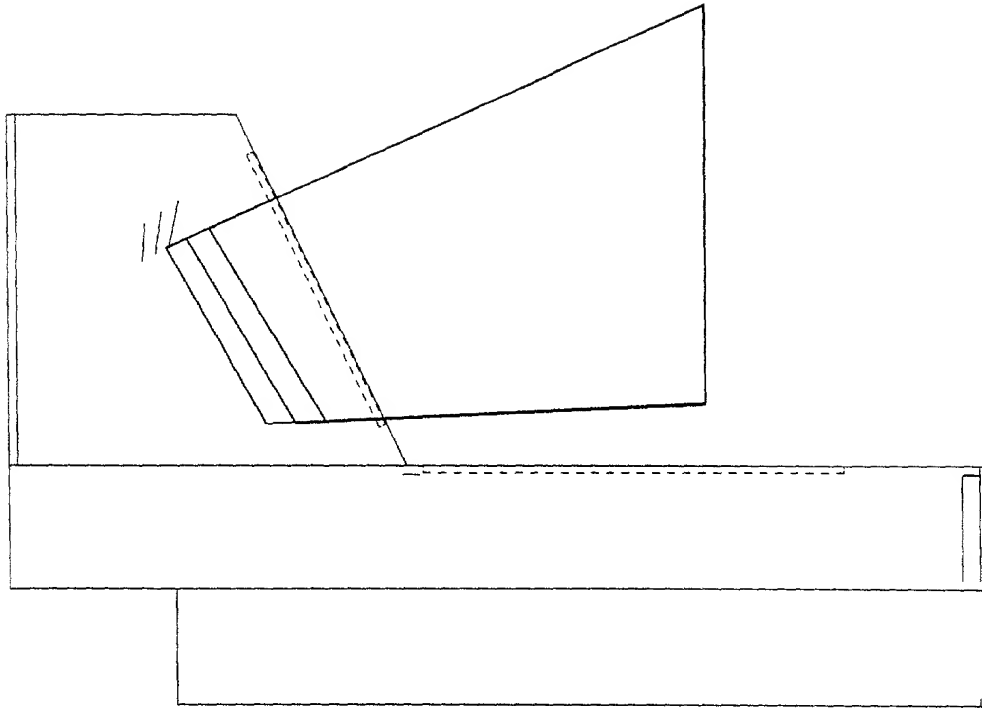


FIG. 5U5

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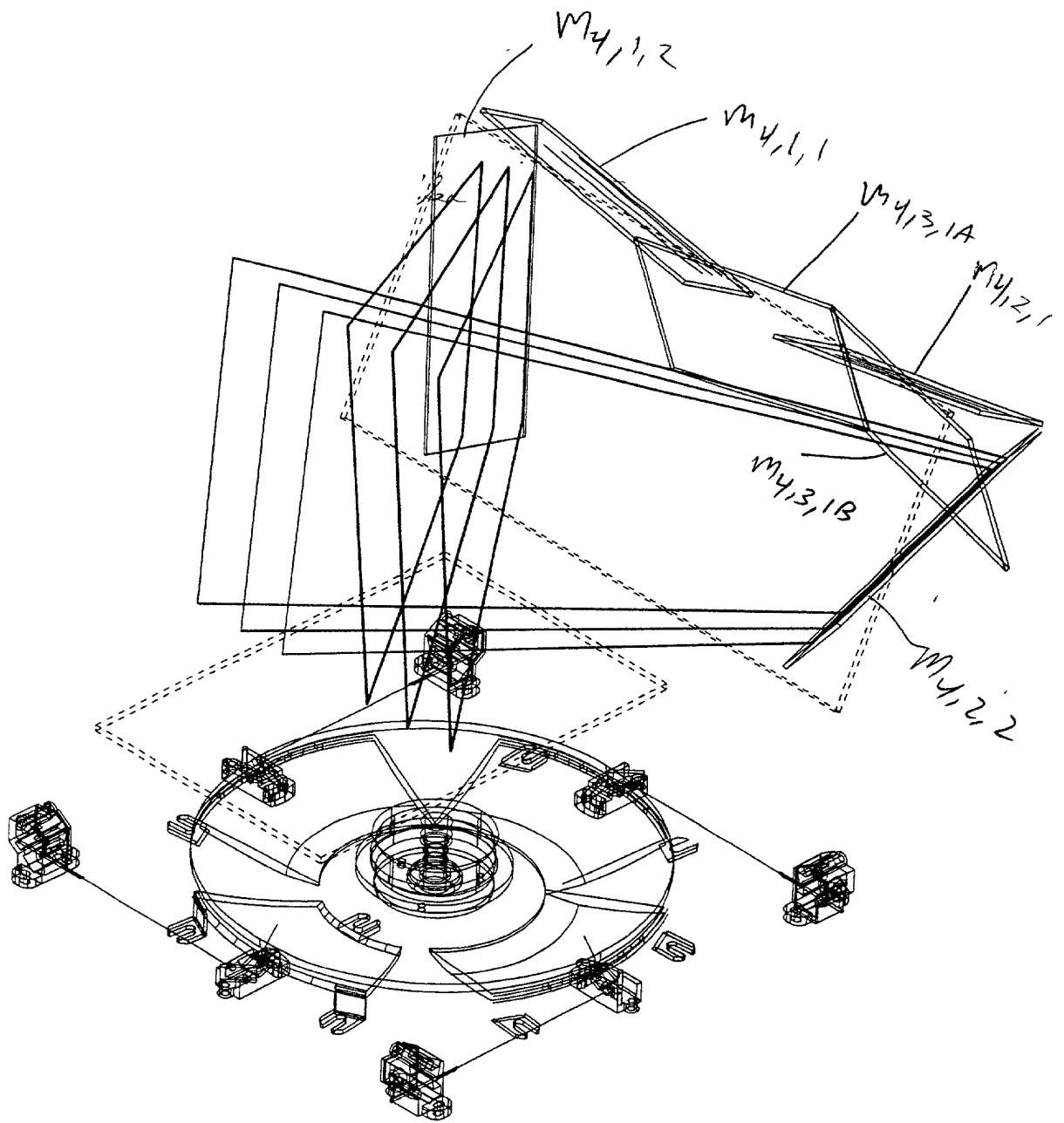


FIG. 5V1

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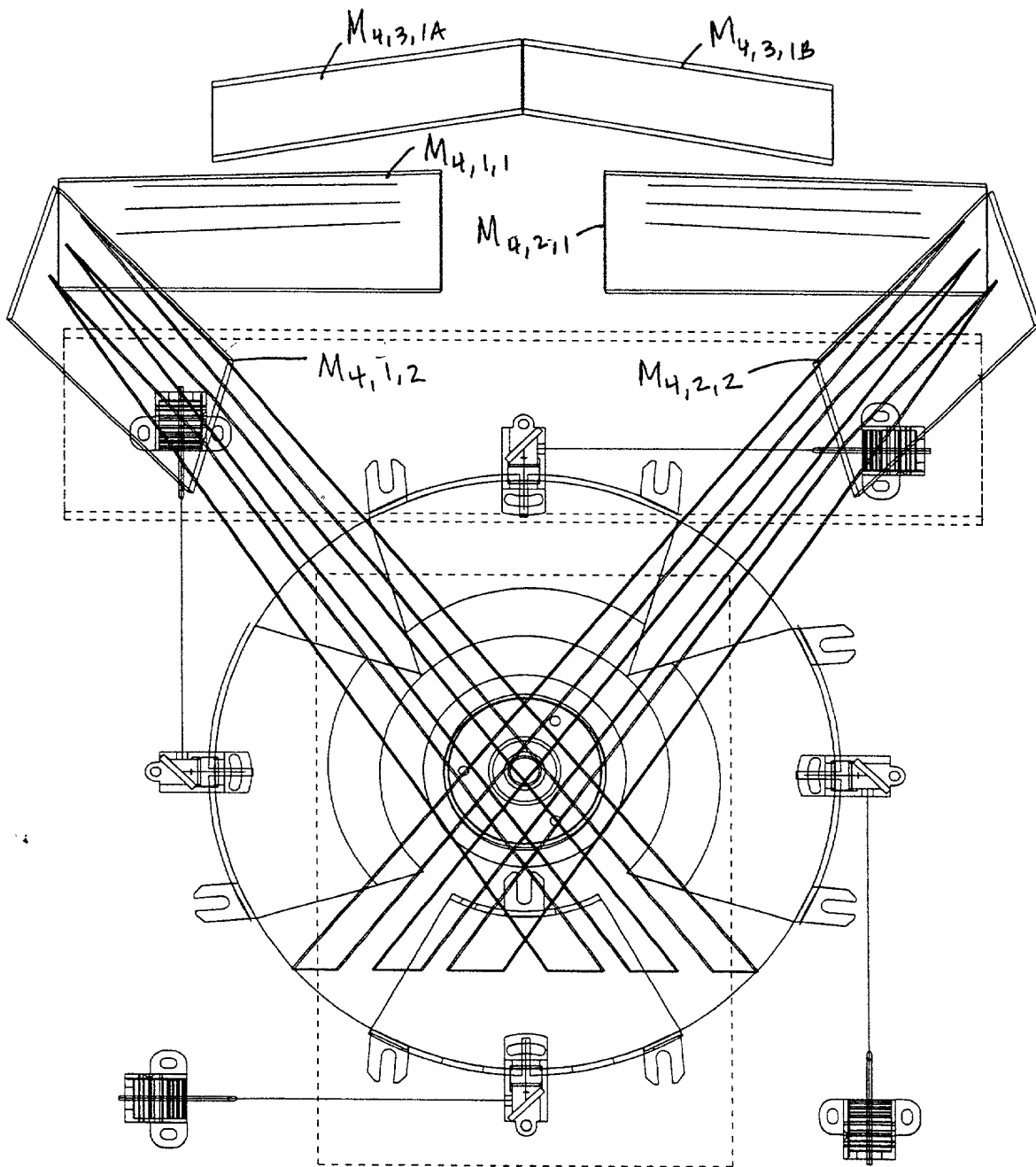


FIG. 5V2

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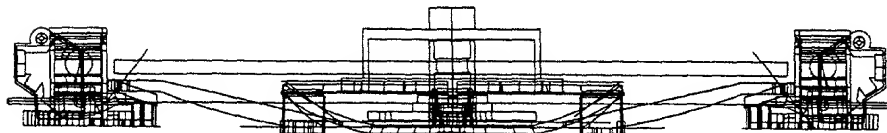
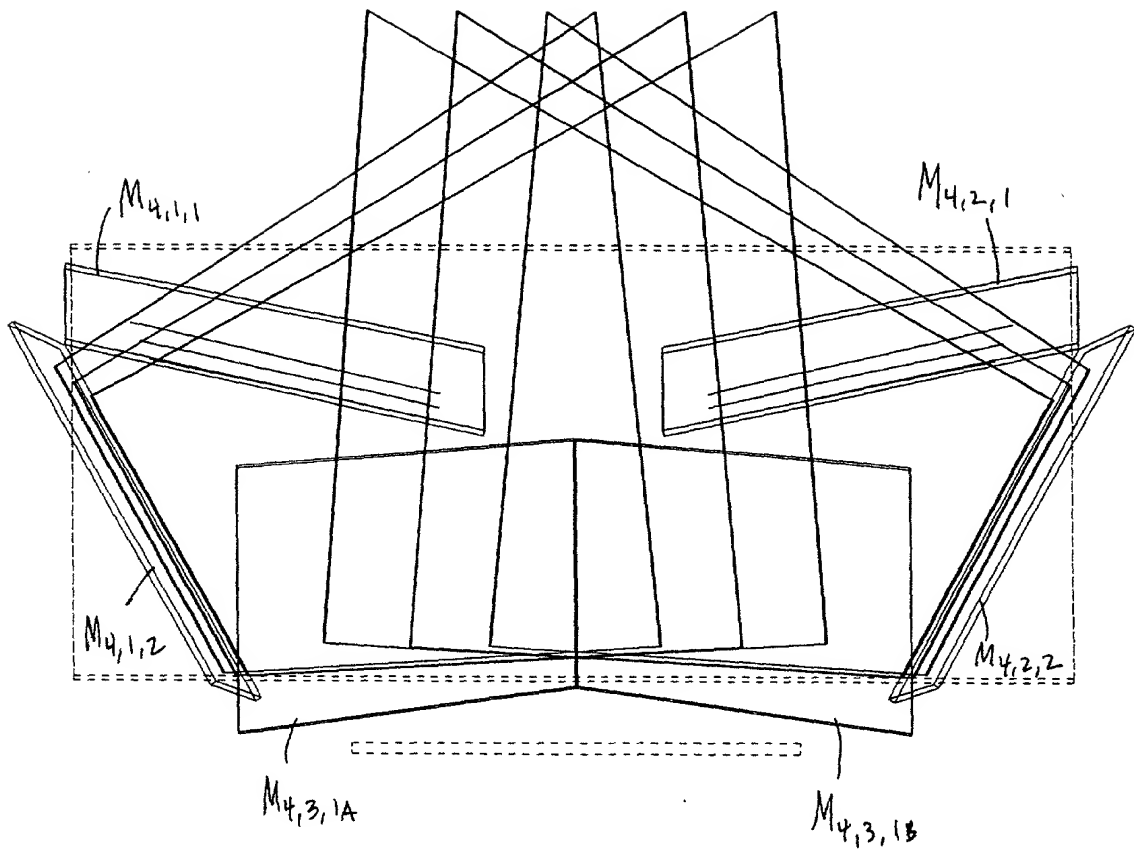


FIG. 5V3

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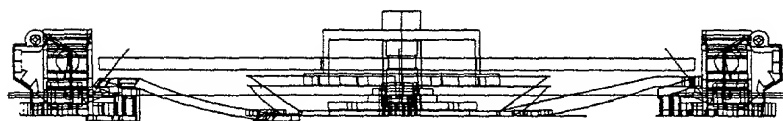
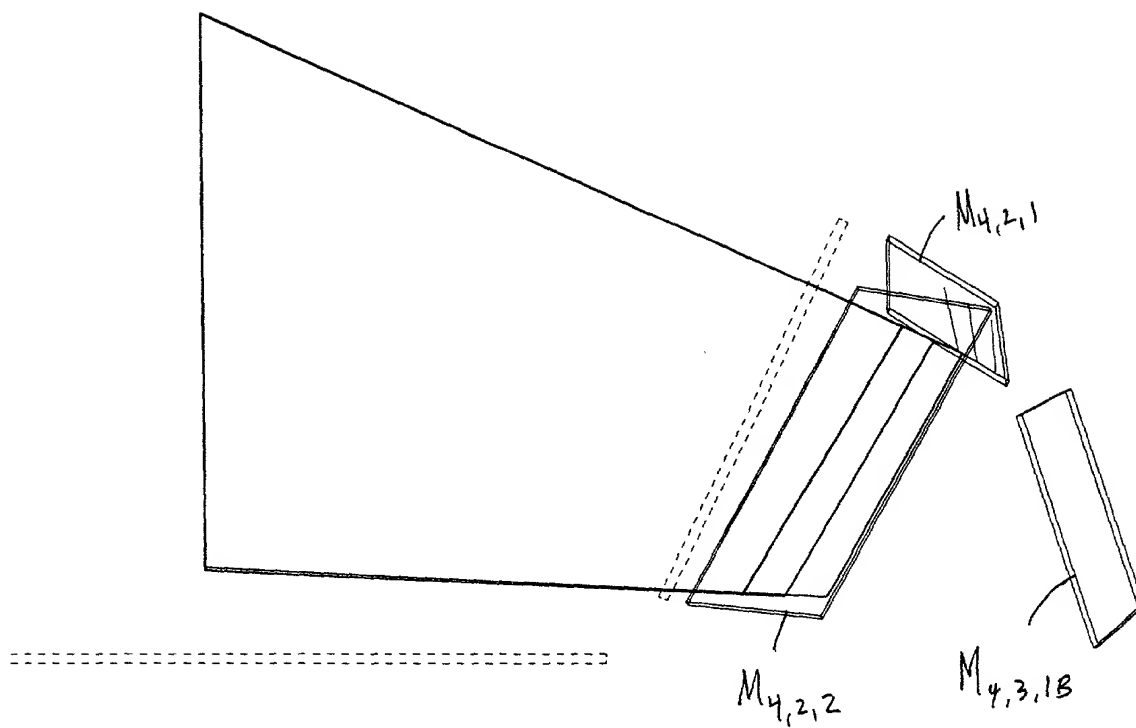


FIG. 5Y4

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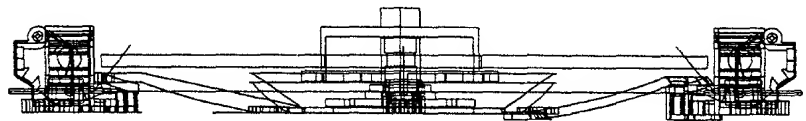
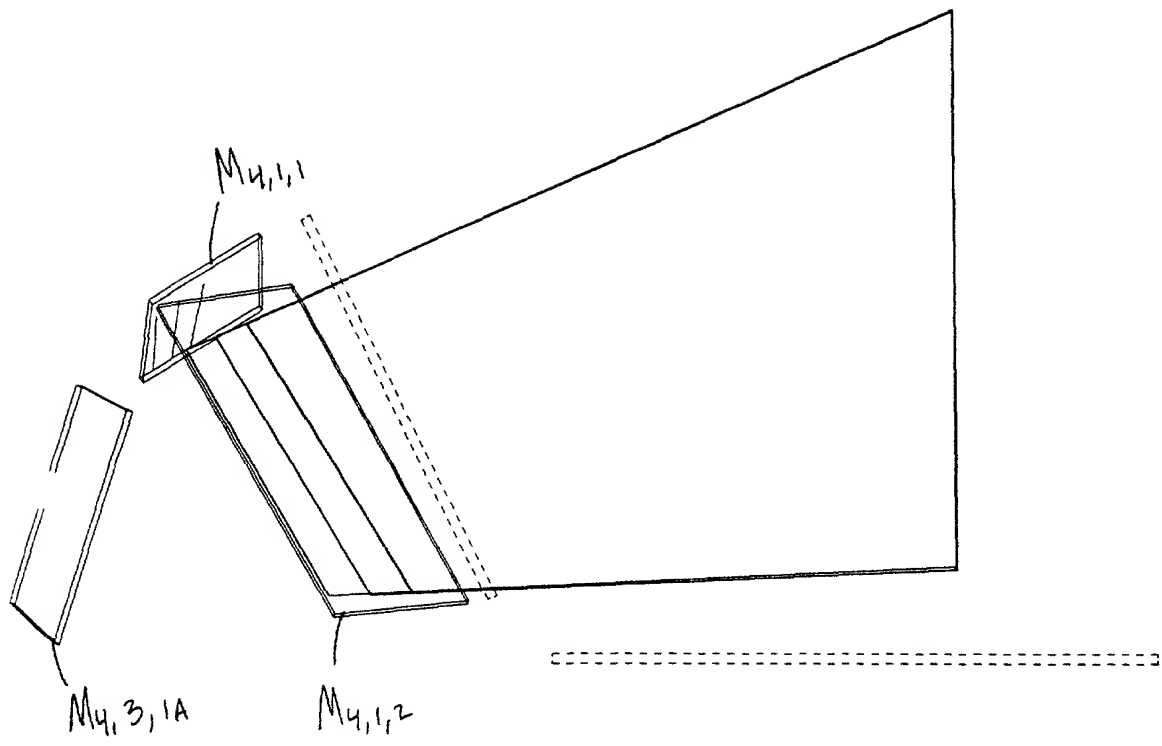


FIG. 5V5

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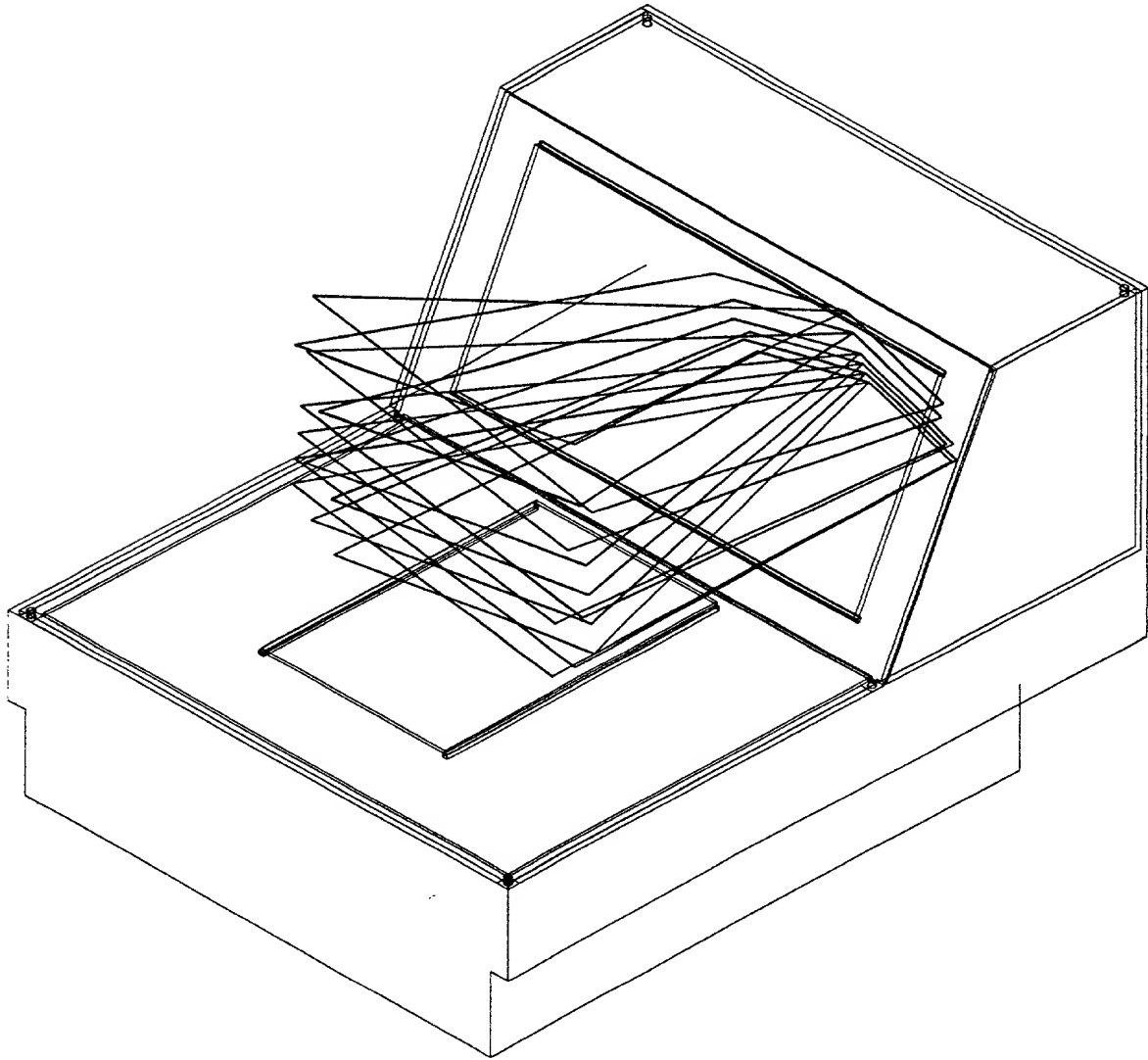


FIG. 5W1

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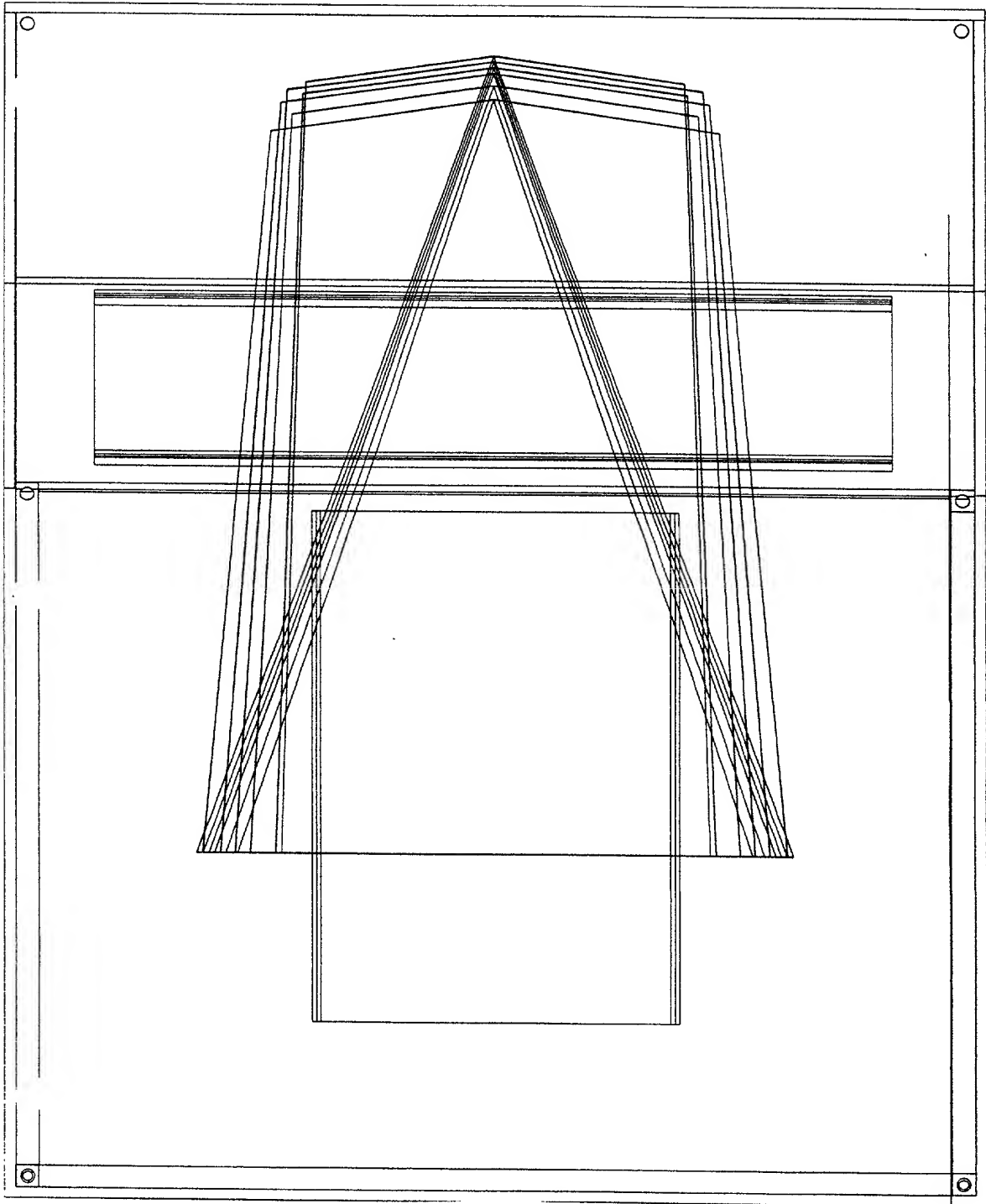


FIG. 5N2

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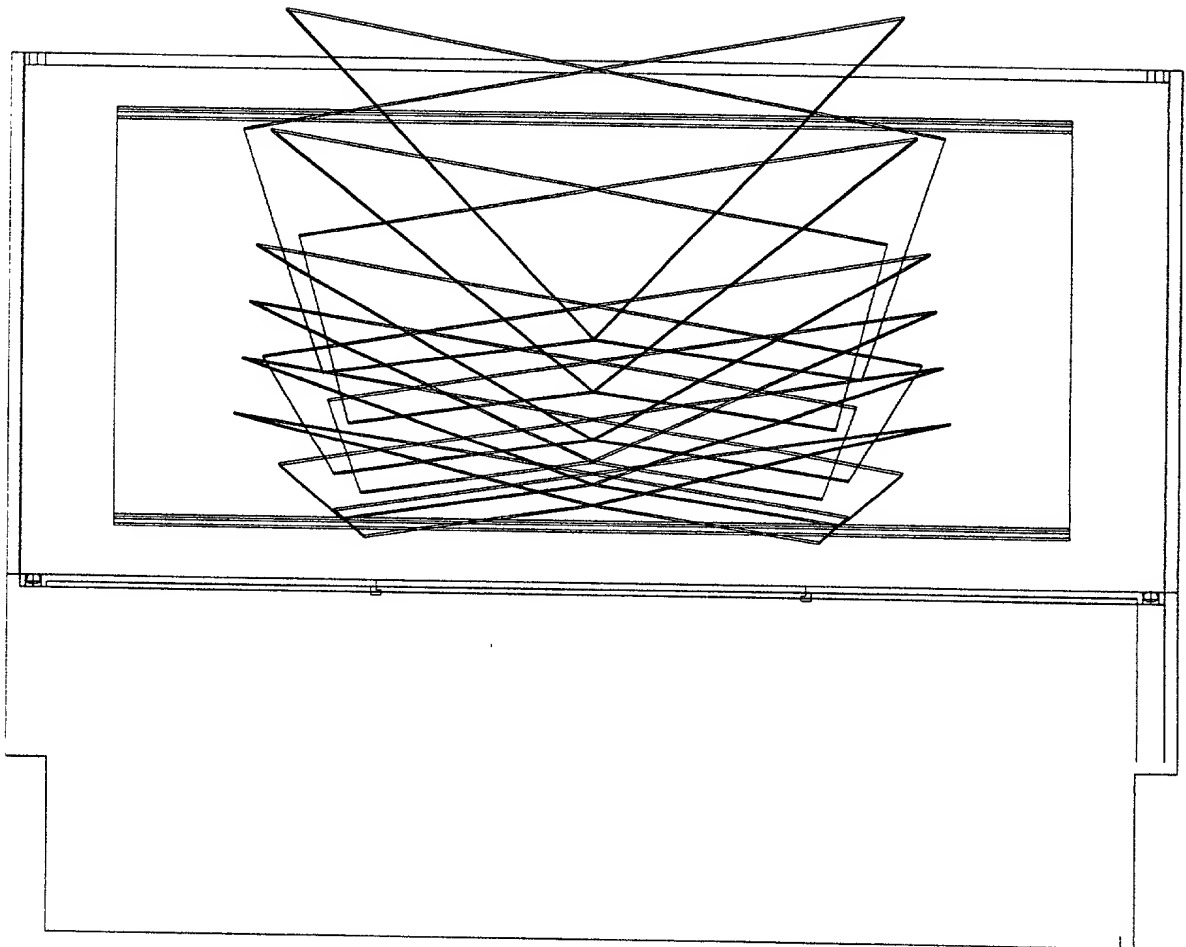


FIG. 5N3

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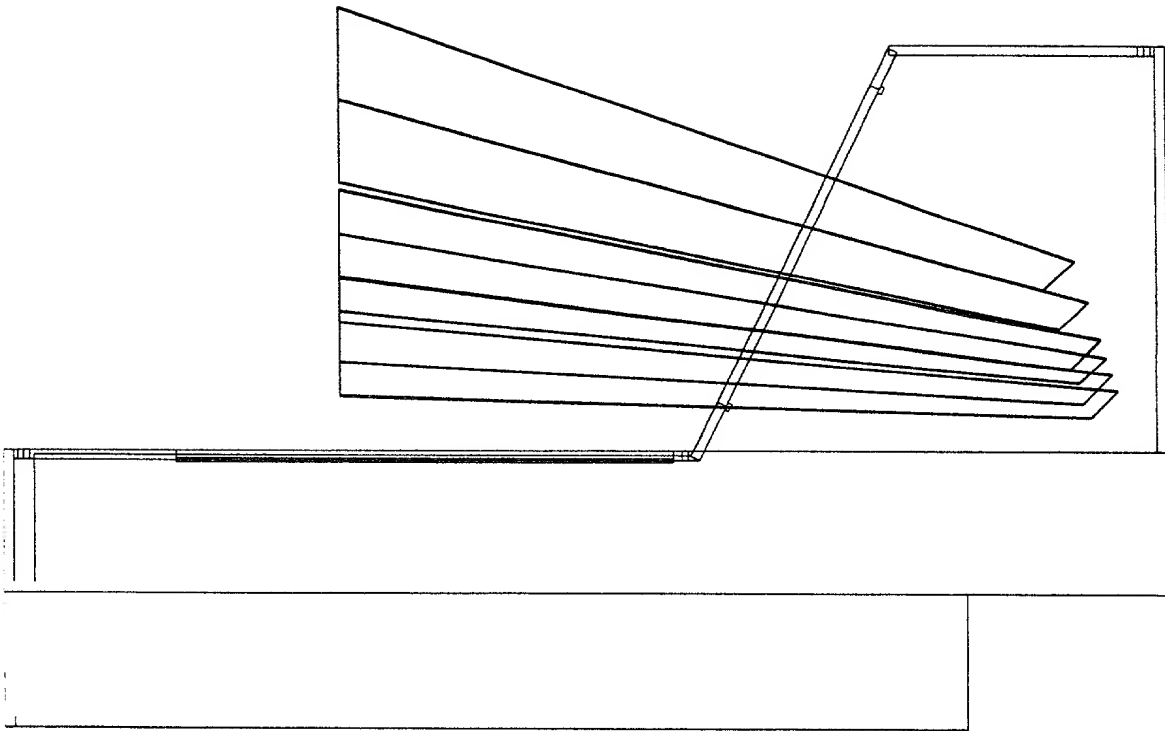


FIG. 5W4

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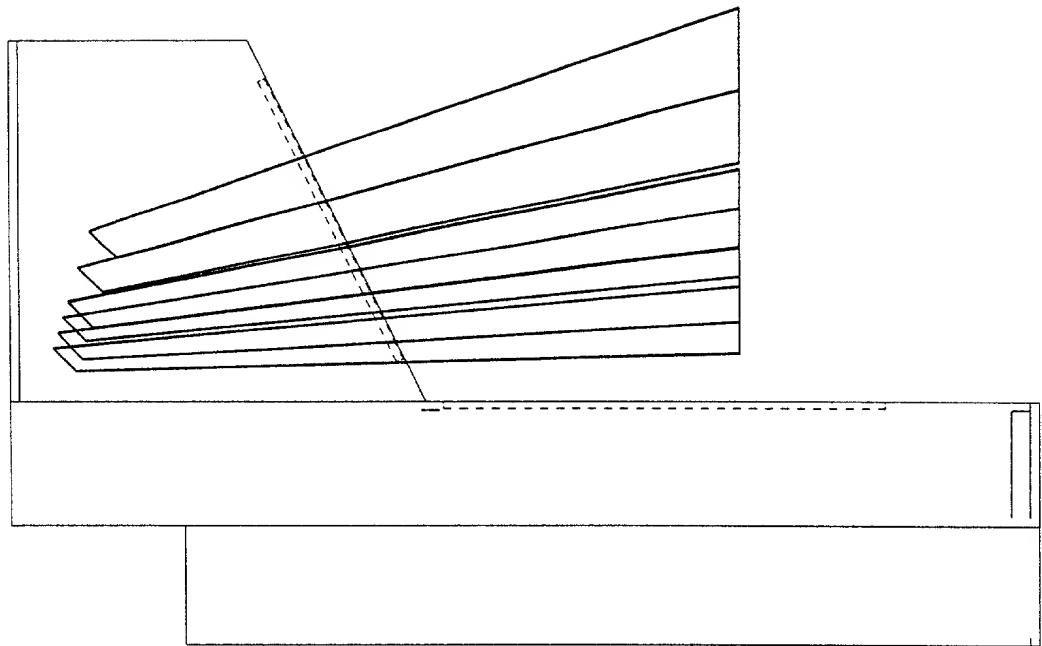


FIG. 5N5

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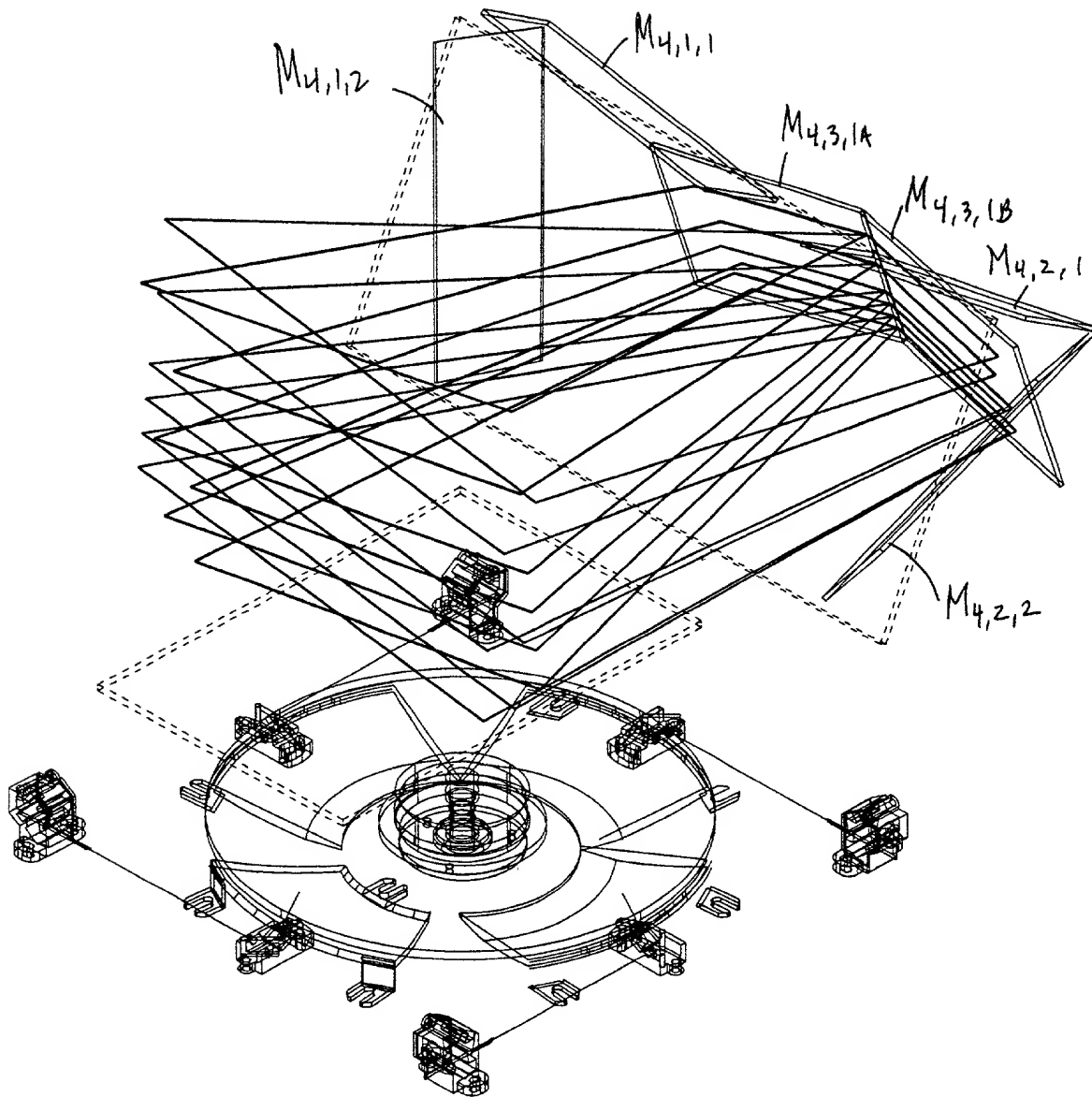


FIG. 5X1

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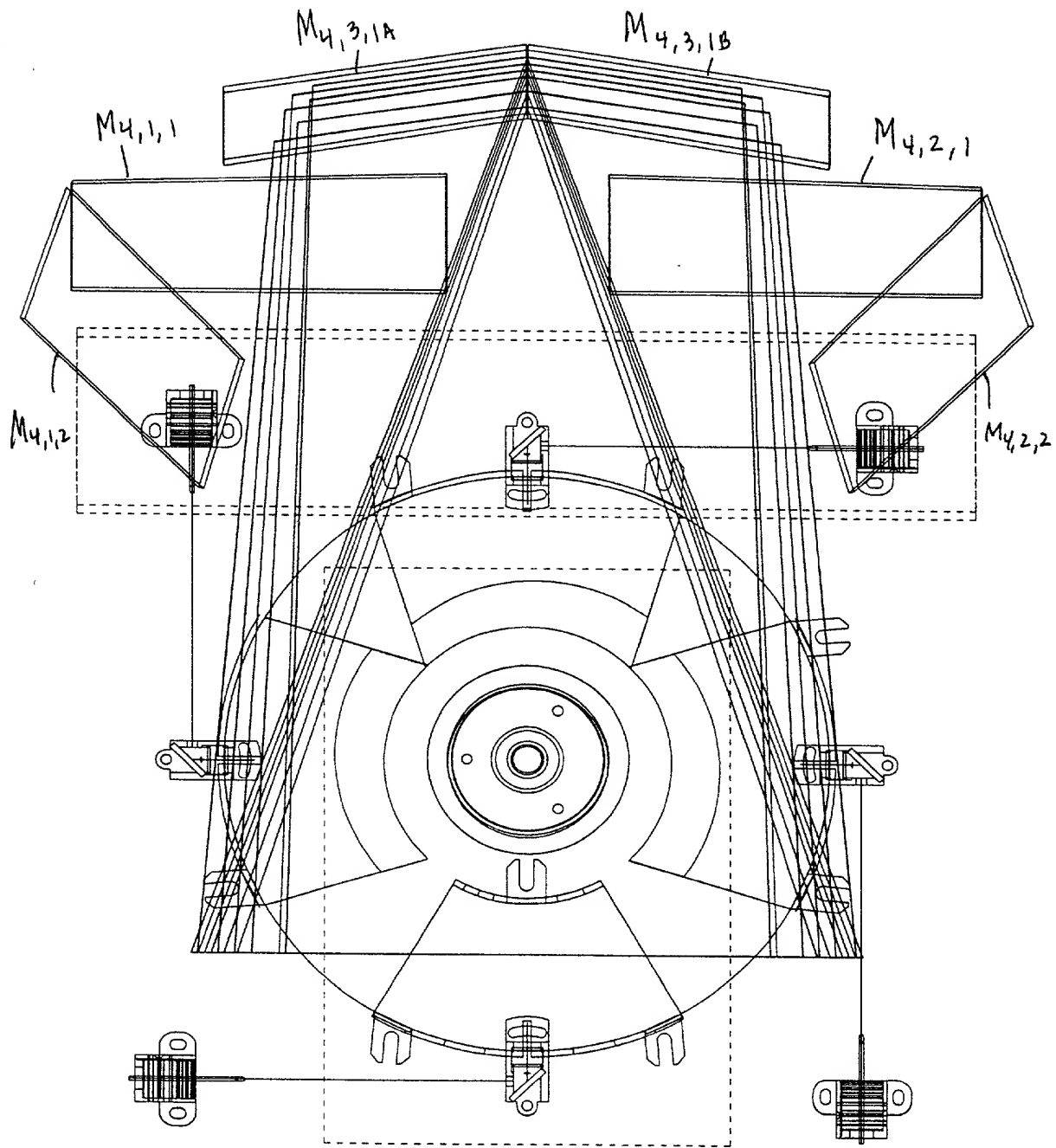


FIG. 5X2

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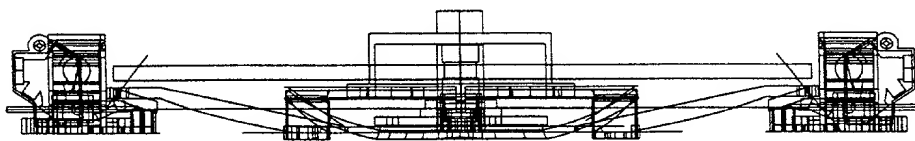
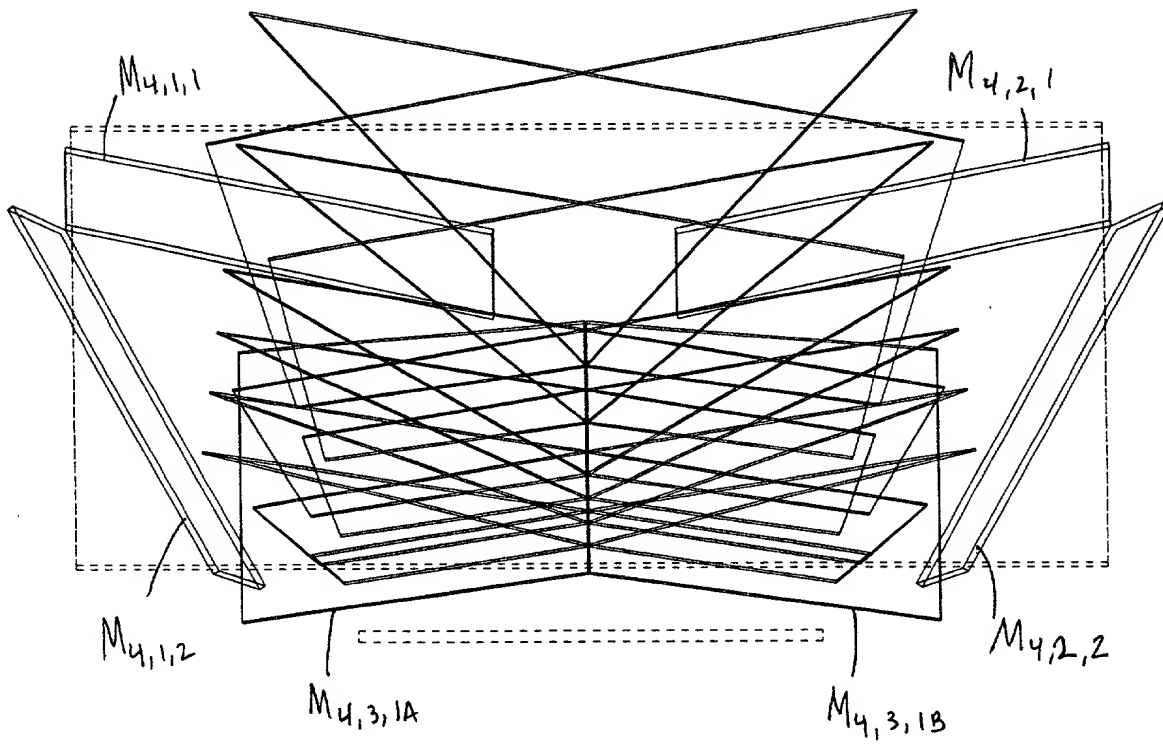


FIG. 5X3

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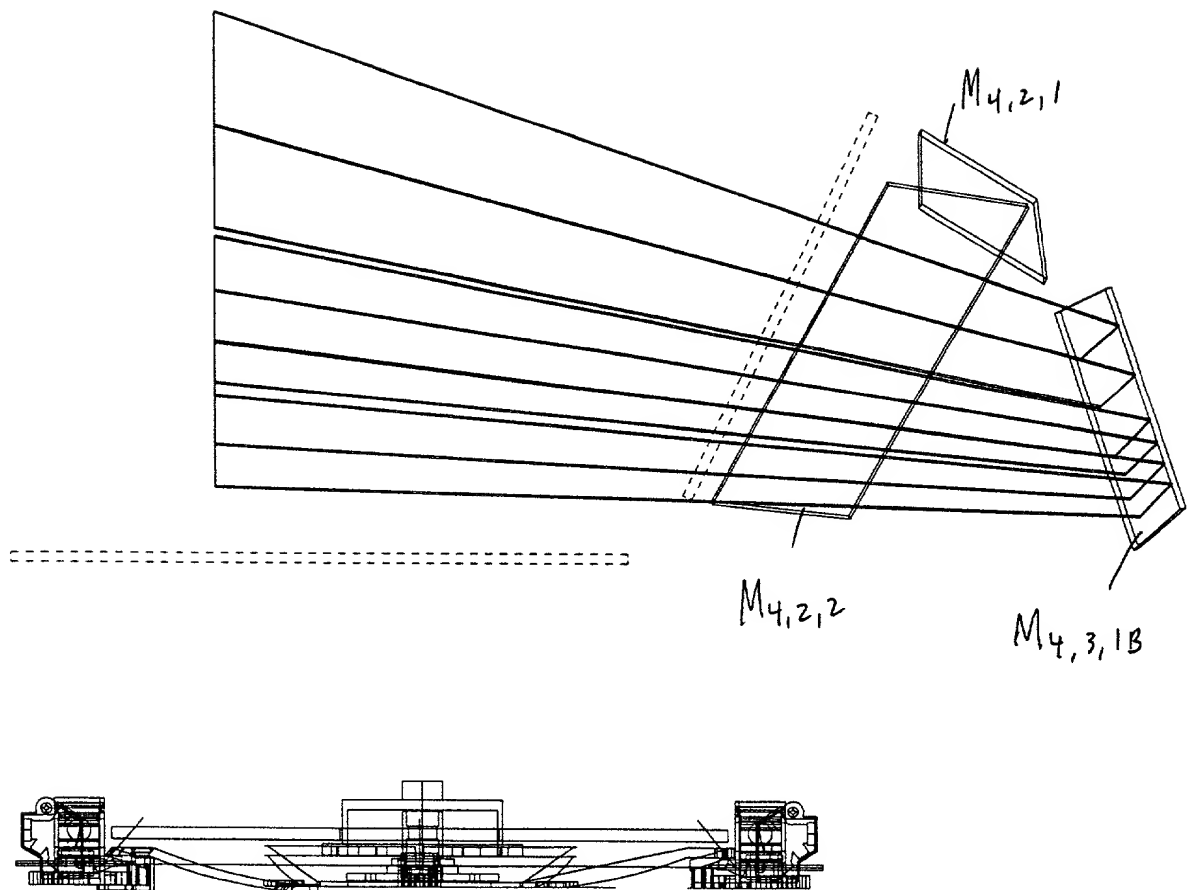


FIG. 5X4

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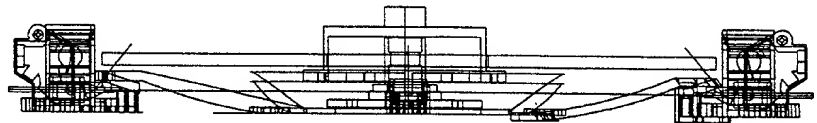
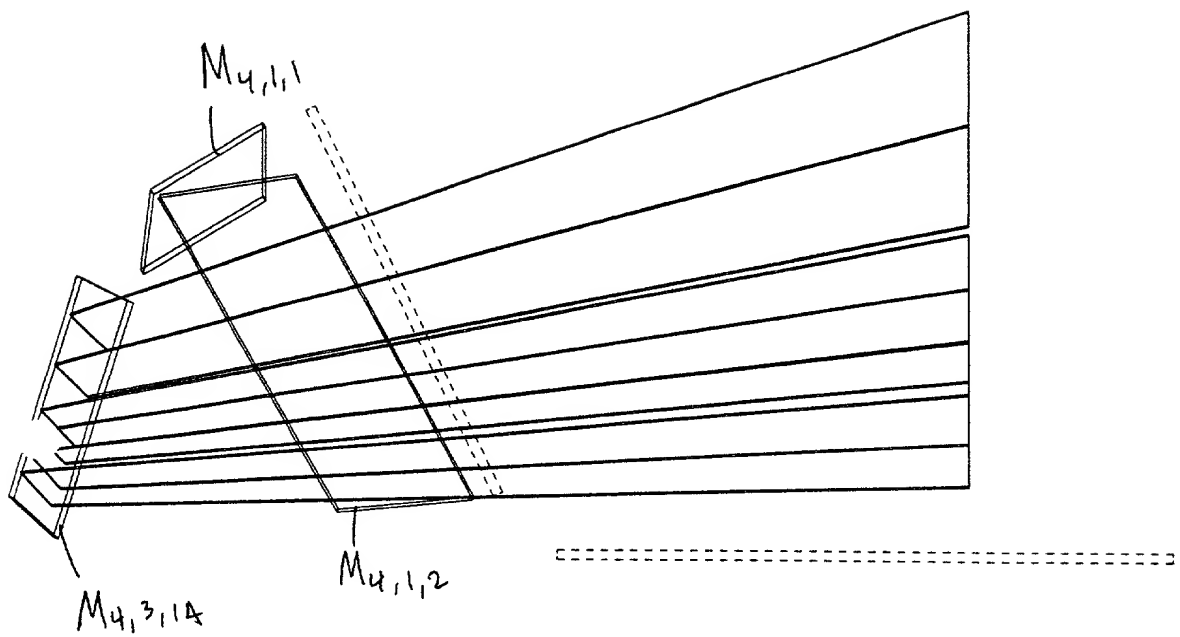


FIG. 5X5

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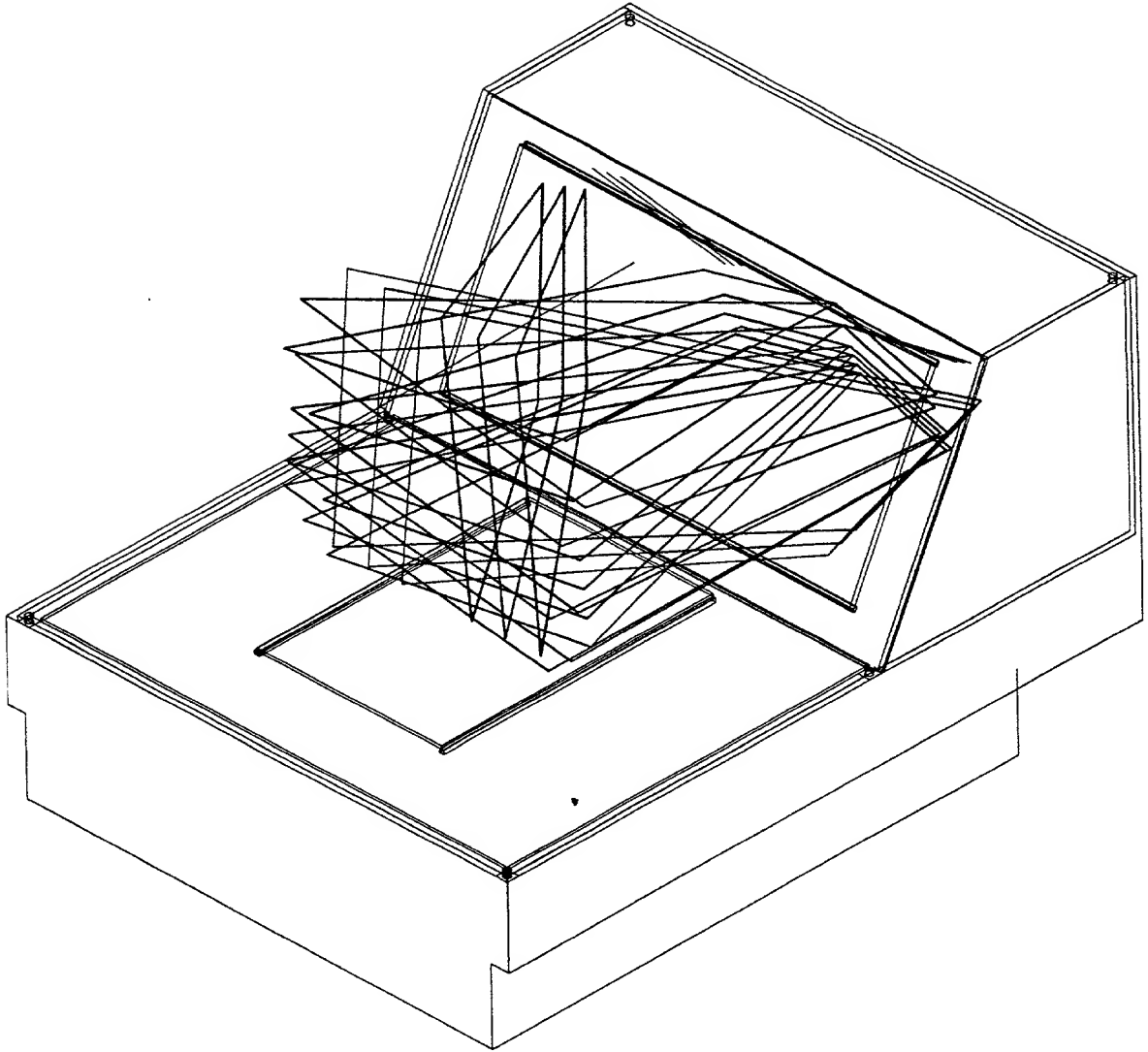


FIG. 5Y1

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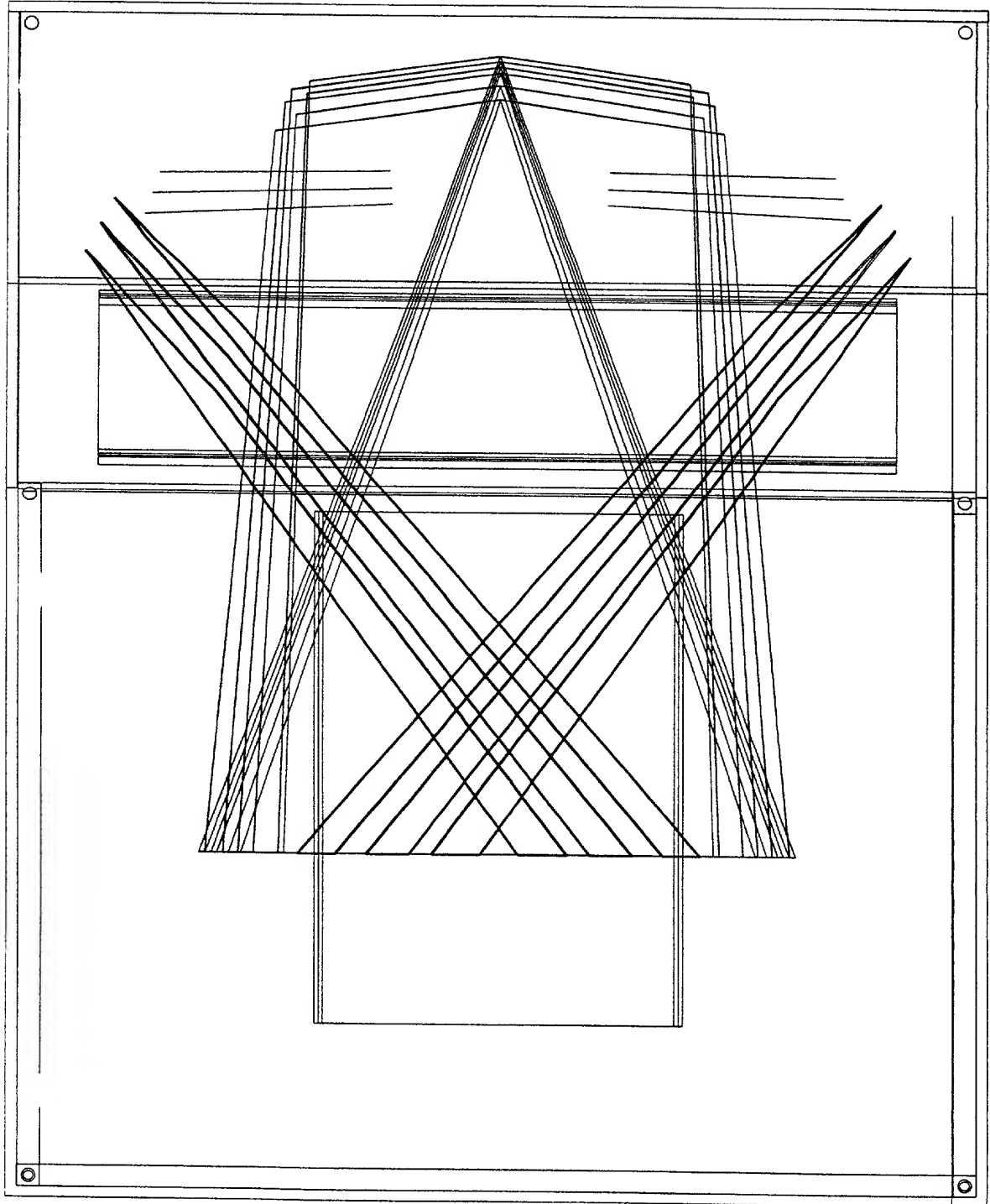


FIG. 542

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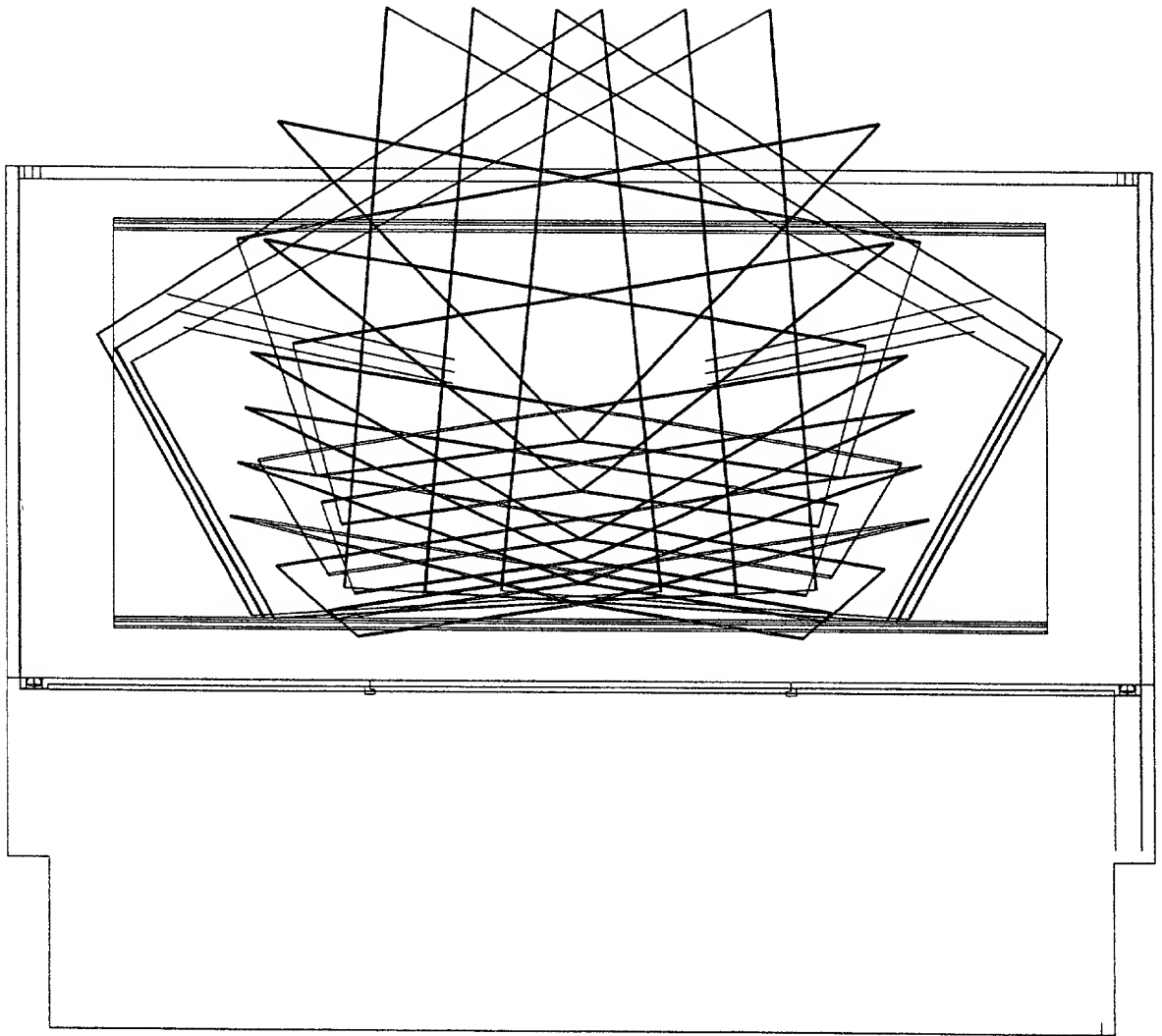


FIG. 5Y3

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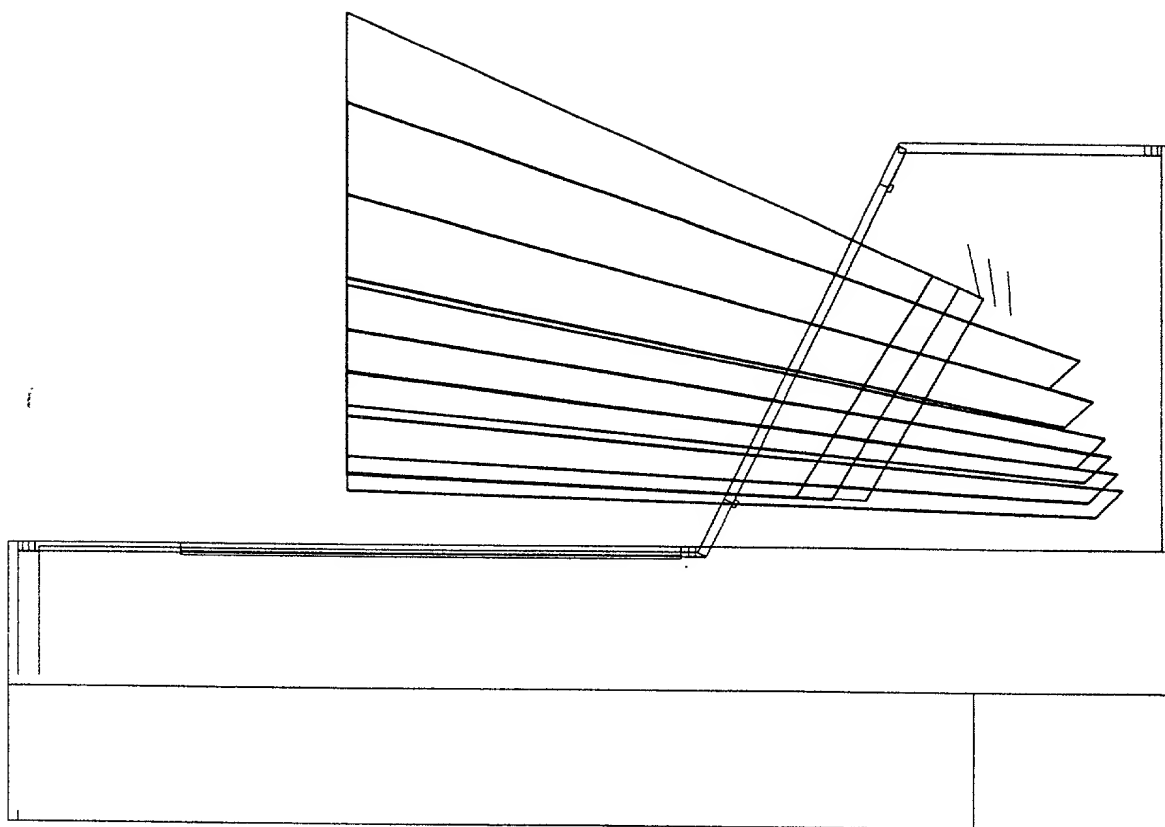


FIG. 5y4

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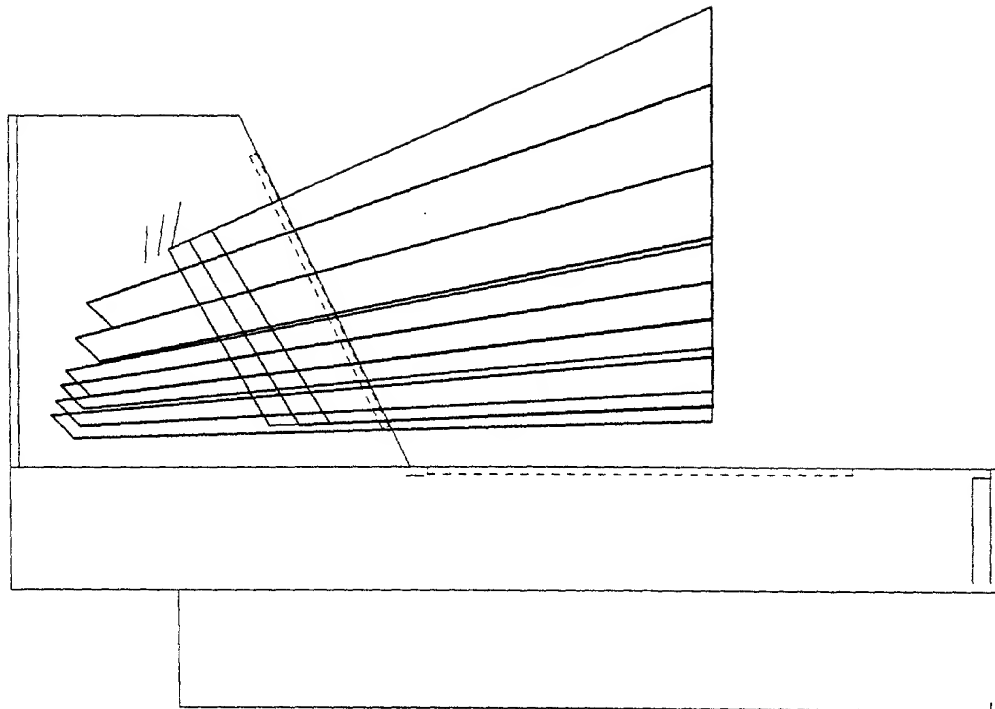


FIG. 545

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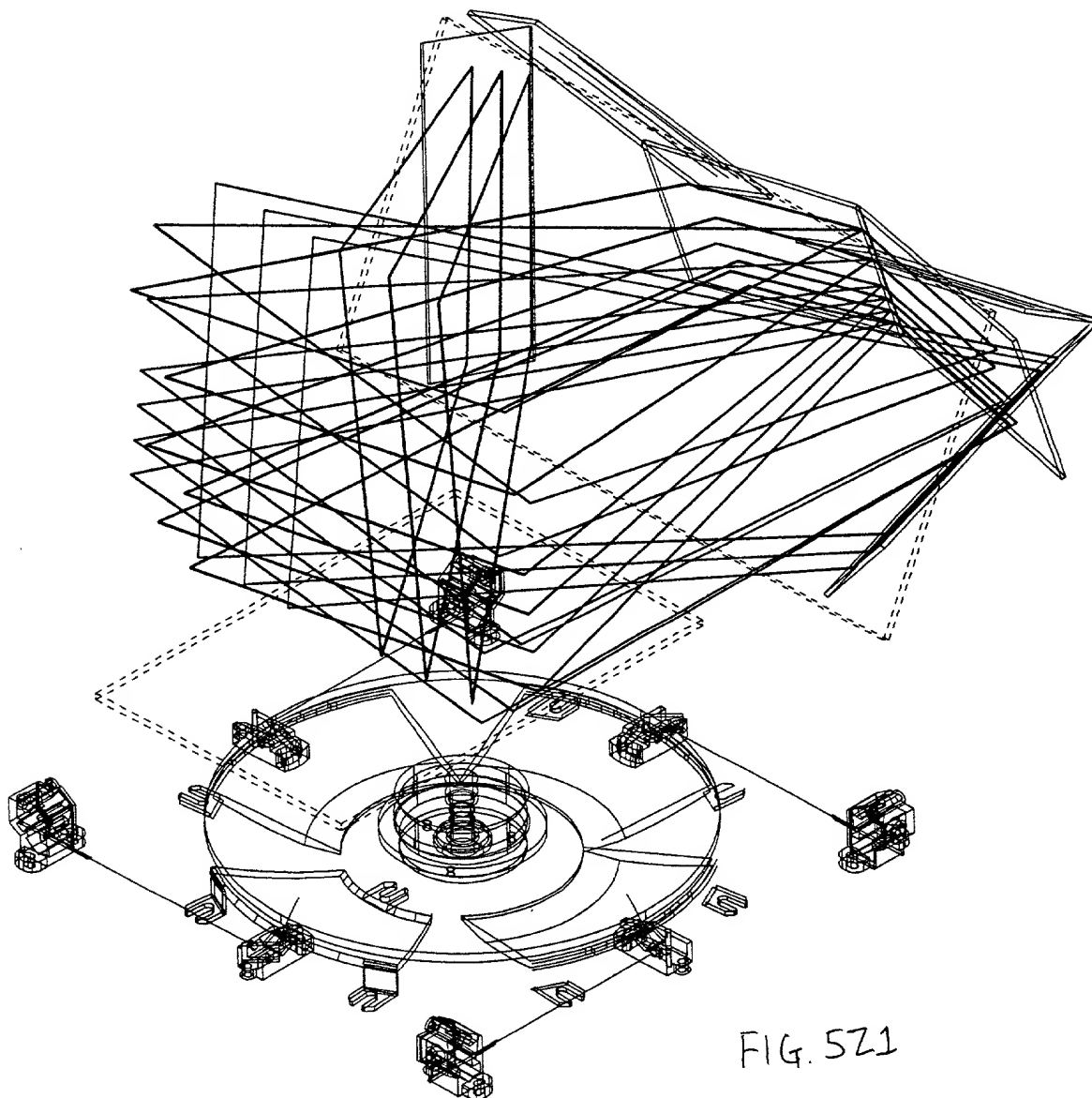


FIG. 5Z1

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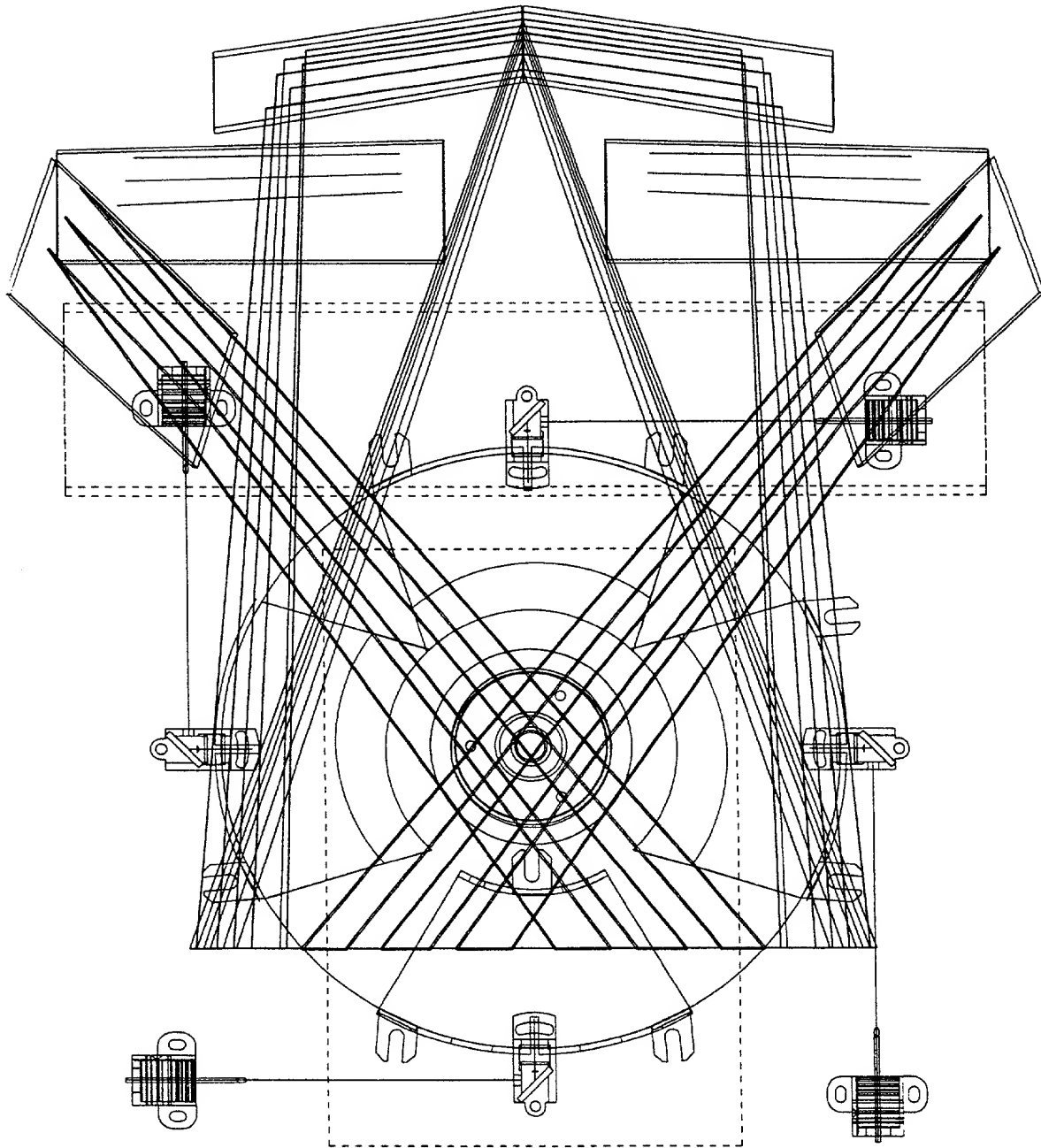


FIG. 572

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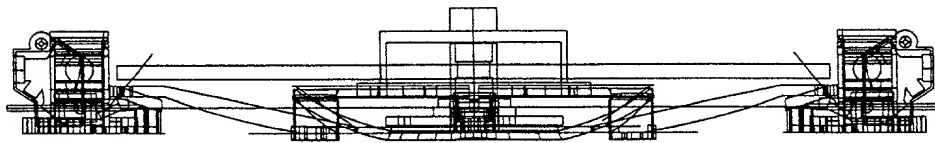
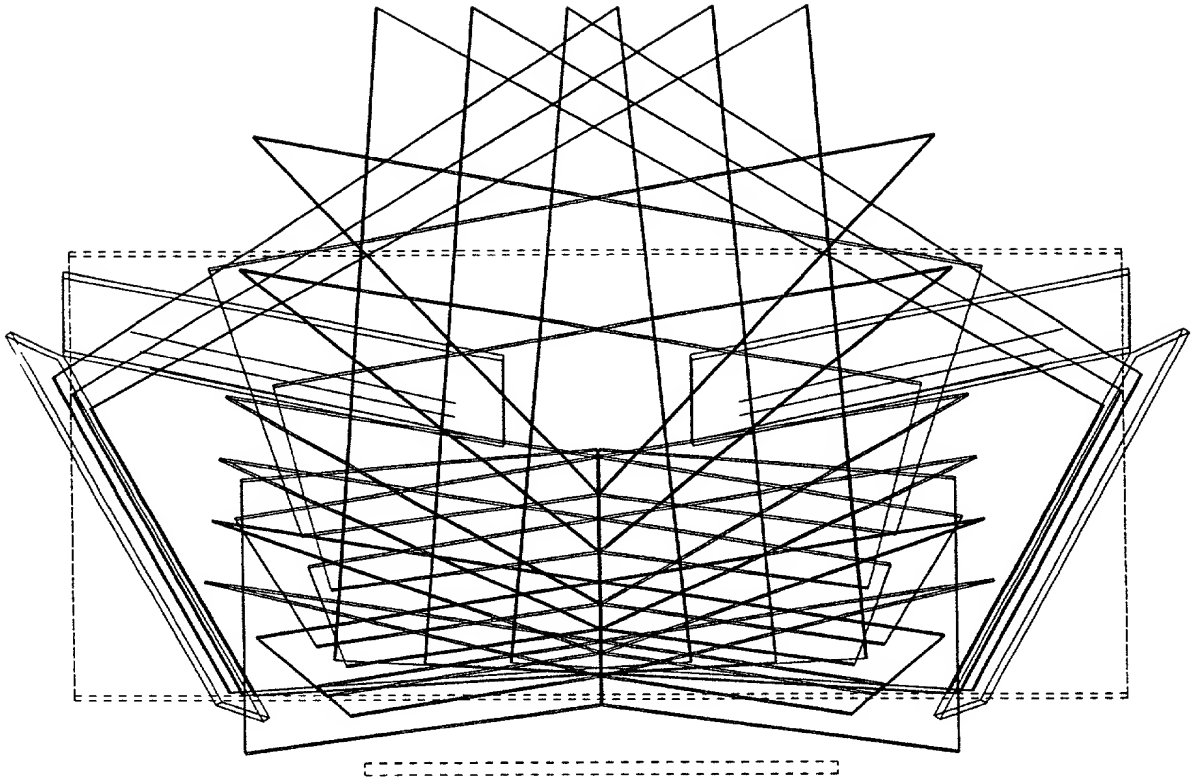


FIG. 523

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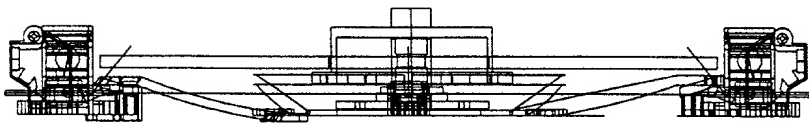
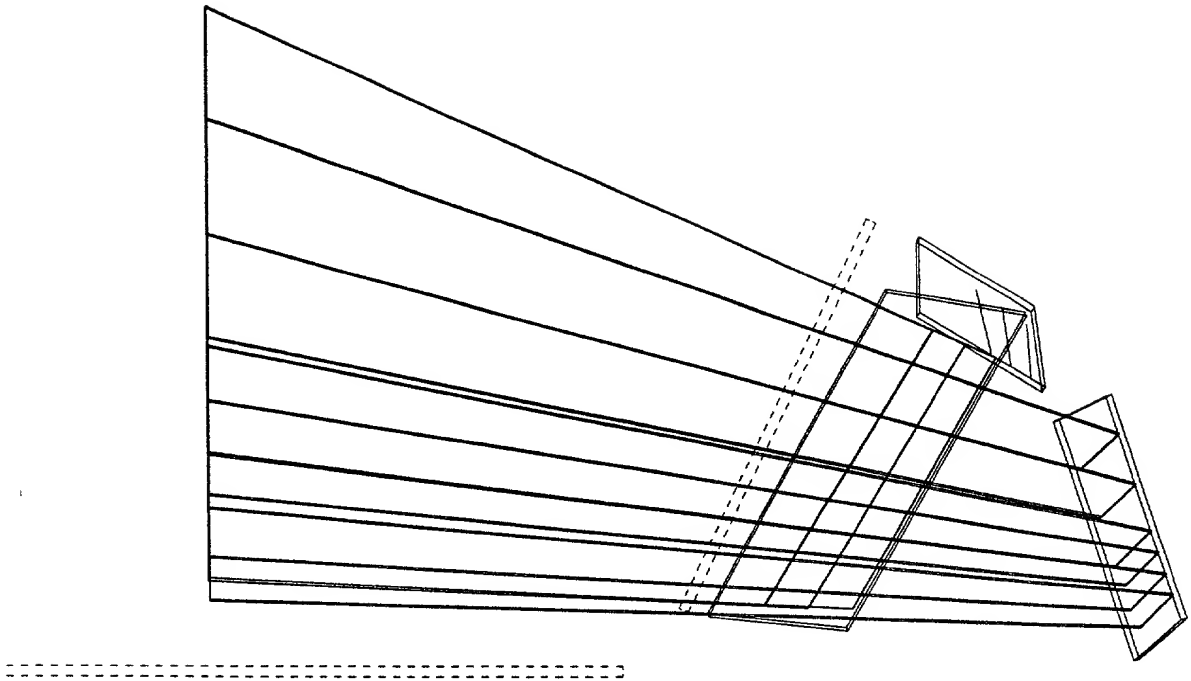


FIG. 524

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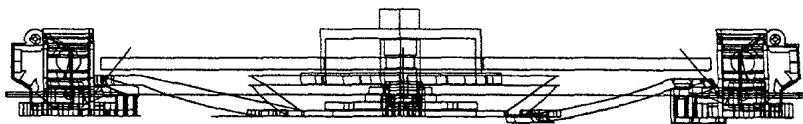
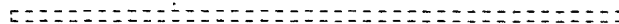
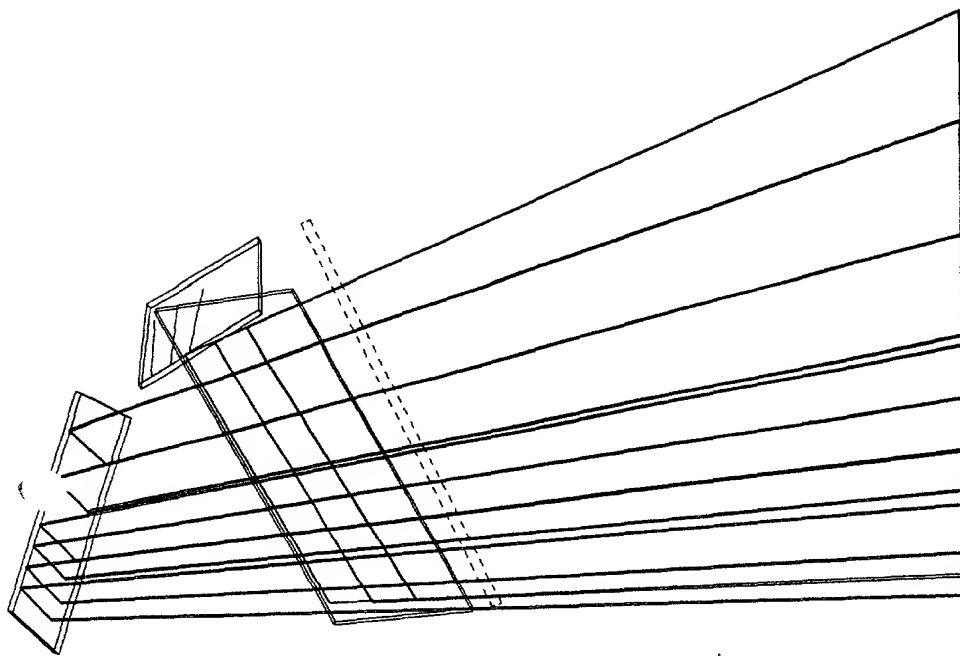


FIG. 5Z5

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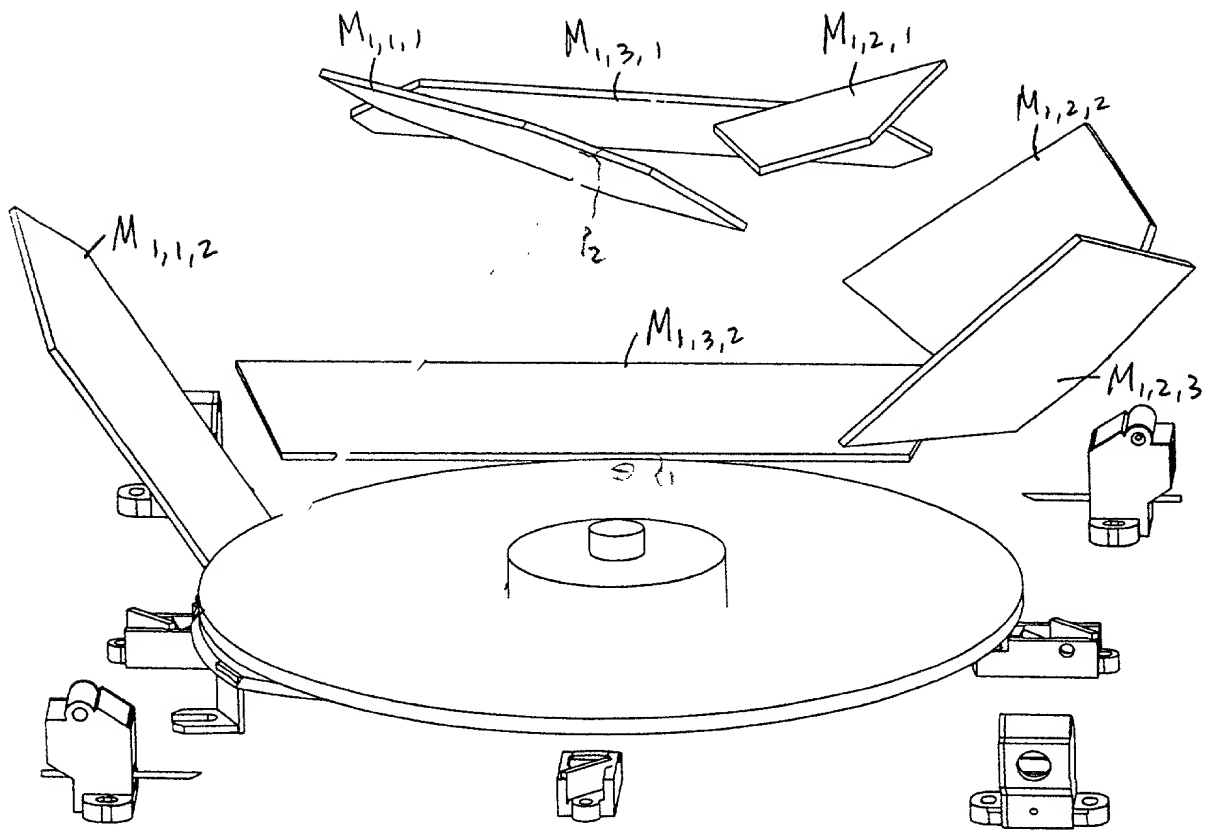


FIG. 6A1

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	N	O	P	Q	R	S	T	U	V	W	X
1											
2											
3											
4	Facet	7									
5	x	y	z								
6	-0.616	0.000	0.788								
7	End			Middle			End				
8	x	y	z		x	y	z		x	y	z
9	0.419	0.416	0.807		0.468	0.249	0.848		0.494	0.048	0.868
10	-0.253	0.917	-0.310		-0.316	0.832	-0.455		-0.387	0.704	-0.596
11	-0.469	-0.414	0.781		-0.537	-0.527	0.659		-0.603	-0.626	0.494
12											
13											
14	Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners				
15	x	y	z		x	y	z		x	y	z
16	3.900	2.436	2.770		1.700	4.102	1.300				
17	4.100	1.879	2.400		3.300	4.400	1.980				
18	3.800	0.137	1.800		3.400	3.990	1.500				
19	3.150	-0.737	1.800		2.300	2.427	-0.625				
20	2.500	-0.159	2.450		1.700	2.524	-0.625				
21	2.650	0.757	2.770		1.050	3.101	-0.050				
22											
23											
24											

FIG. 6A2

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	A	B	C	D	E	F	G	H	I	J	K	L
1	Station 1											
2												
3												
4	High Elevation Left Skew	Facet	9									
5	(G2)	x	y	z								
6	Vector from Module	-0.616	0.000	0.788								
7		End										
8		x	y	z								
9	Output Vectors From Disk	0.378	0.445	0.812								
10	First Mirror Reflected Directions	-0.269	0.927	-0.263								
11	Second Mirror Reflected Directions	-0.479	-0.367	0.797								
12	Third Mirror Reflected Directions											
13												
14		Mirror 1 Corners										
15		x	y	z								
16	1	3.900	2.436	2.770								
17	2	4.100	1.879	2.400								
18	3	3.800	0.137	1.800								
19	4	3.150	-0.737	1.800								
20	5	2.500	-0.159	2.450								
21	6	2.650	0.757	2.770								
22	7											
23	8											
		Mirror 2 Corners										
		x	y	z								
	1	3.900	4.102	1.300								
	2	3.300	4.400	1.980								
	3	3.400	3.990	1.500								
	4	2.300	2.427	-0.625								
	5	1.700	2.524	-0.625								
	6	1.050	3.101	-0.050								
	7											
	8											
		Mirror 3 Corners										
		x	y	z								
	1	1.700	4.102	1.300								
	2	3.300	4.400	1.980								
	3	3.400	3.990	1.500								
	4	2.300	2.427	-0.625								
	5	1.700	2.524	-0.625								
	6	1.050	3.101	-0.050								
	7											
	8											

FIG. 6A3

Station 1

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	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1											
2											
3											
4	Facet	11									
5	x	y	z								
6	-0.616	0.000	0.788								
7		End				Middle				End	
8	x	y	z		x	y	z		x	y	z
9	0.333	0.476	0.814		0.415	0.220	0.883		0.433	0.086	0.897
10	-0.284	0.935	-0.211		-0.382	0.813	-0.440		-0.429	0.728	-0.535
11	-0.487	-0.316	0.814		-0.594	-0.496	0.633		-0.638	-0.564	0.524
12											
13											
14											
15		Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
16	x	y	z		x	y	z		x	y	z
17	3.900	2.436	2.770		1.700	4.102	1.300				
18	4.100	1.879	2.400		3.300	4.400	1.980				
19	3.800	0.137	1.800		3.400	3.990	1.500				
20	3.150	-0.737	1.800		2.300	2.427	-0.625				
21	2.500	-0.159	2.450		1.700	2.524	-0.625				
22	2.650	0.757	2.770		1.050	3.101	-0.050				
23											
24											

FIG. 6A4

Station 1

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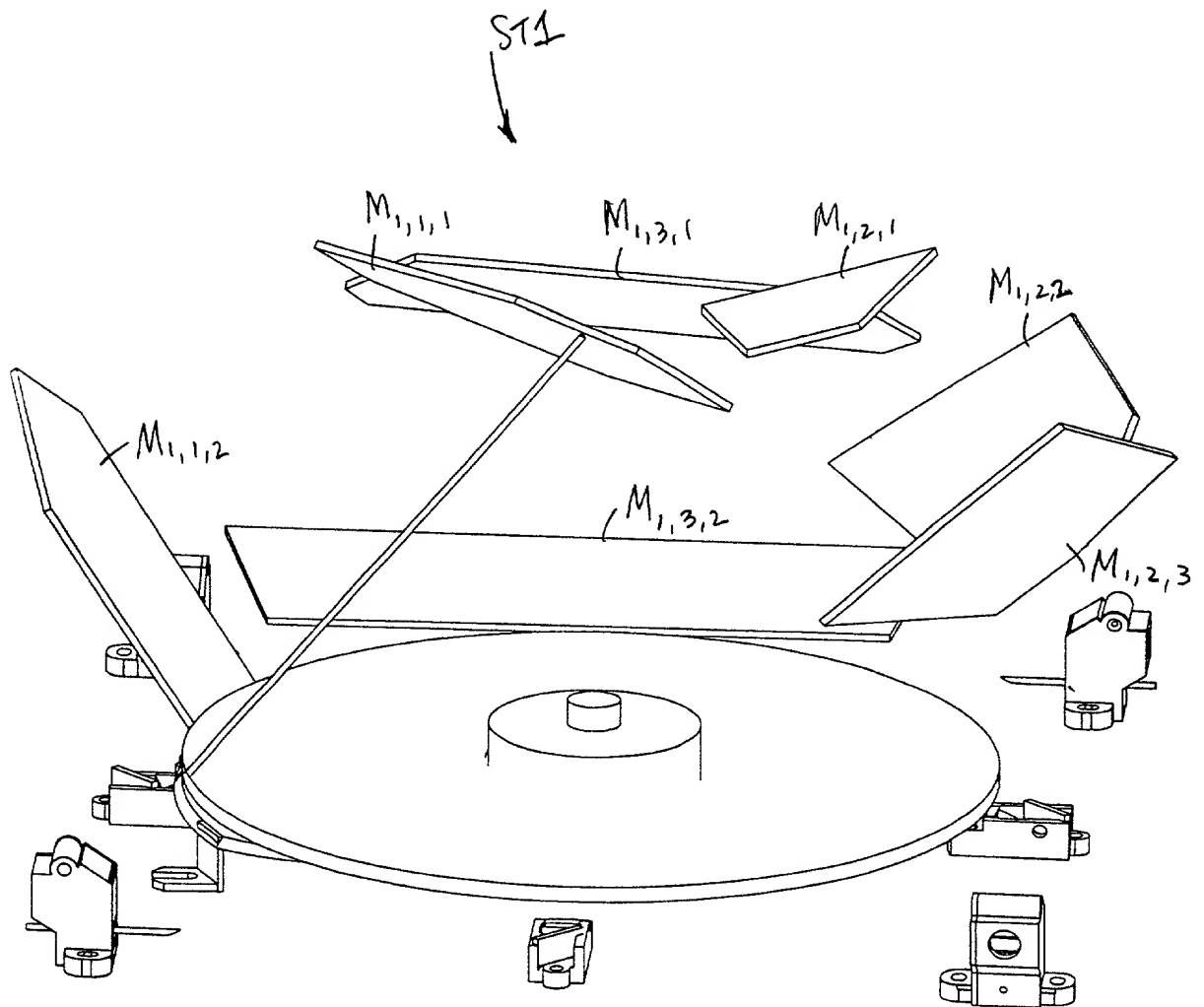


FIG. 6B1

When using this report, it is important to note that the data is only valid for the purpose of the report and should not be used for any other purpose.

2

	N	O	P	Q	R	S	T	U	V	W	X
25	Facet	8									
26	x	y	z								
27	-0.616	0.000	0.788								
28		End				Middle				End	
29	x	y	z		x	y	z		x	y	z
30	0.468	-0.249	0.848		0.468	-0.249	0.848		0.430	-0.387	0.816
31	0.408	-0.675	-0.614		0.408	-0.675	-0.614		0.375	-0.774	-0.510
32	-0.999	0.012	-0.034		-0.999	0.012	-0.034		-0.993	-0.106	0.054
33	-0.616	0.531	0.582		-0.616	0.531	0.582		-0.605	0.419	0.677
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											

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FIG. 6B2

Station 1

	A	B	C	D	E	F	G	H	I	J	K	L
25	High Elevation Right Skew	Facet	10									
26	(G1)	x	y	z								
27	Vector from Module	-0.616	0.000	0.788								
28			End				Middle				End	
29		x	y	z		x	y	z		x	y	z
30	Output Vectors From Disk	0.441	-0.235	0.866		0.441	-0.235	0.866		0.398	-0.391	0.830
31	First Mirror Reflected Directions	0.380	-0.673	-0.635		0.380	-0.673	-0.635		0.343	-0.784	-0.517
32	Second Mirror Reflected Directions	-0.998	0.000	-0.067		-0.998	0.000	-0.067		-0.991	-0.133	0.033
33	Third Mirror Reflected Directions	-0.589	0.553	0.589		-0.589	0.553	0.589		-0.578	0.426	0.697
34												
35		Mirror 1 Corners					Mirror 2 Corners			Mirror 3 Corners		
36		x	y	z		x	y	z		x	y	z
37	1	2.550	-1.630	2.650		4.000	-2.630	0.049		3.746	-3.750	1.000
38	2	4.150	-2.267	2.770		4.900	-1.400	0.775		1.371	-3.300	2.100
39	3	3.950	0.196	2.060		4.600	-3.150	2.118		1.159	-1.600	0.800
40	4	2.420	-0.309	2.270		3.800	-3.900	1.067		2.824	-2.000	0.100
41	5									3.771	-2.700	0.100
42	6											
43	7											
44	8											
45												

FIG. 6B3

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Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
25 Facet	12									
26 x	y	z								
27 -0.616	0.000	0.788								
28	End				Middle				End	
29 x	y	z		x	y	z		x	y	z
30 0.415	-0.220	0.883		0.415	-0.220	0.883		0.369	-0.387	0.845
31 0.351	-0.669	-0.655		0.351	-0.669	-0.655		0.312	-0.788	-0.530
32 -0.995	-0.012	-0.099		-0.995	-0.012	-0.099		-0.988	-0.153	0.007
33 -0.562	0.574	0.596		-0.562	0.574	0.596		-0.550	0.439	0.710
34										
35	Mirror 1 Corners			Mirror 2 Corners				Mirror 3 Corners		
36 x	y	z		x	y	z		x	y	z
37 2.550	-1.630	2.650		4.000	-2.630	0.049		3.746	-3.750	1.000
38 4.150	-2.267	2.770		4.900	-1.400	0.775		1.371	-3.300	2.100
39 3.950	0.196	2.060		4.600	-3.150	2.118		1.159	-1.600	0.800
40 2.420	-0.309	2.270		3.800	-3.900	1.067		2.824	-2.000	0.100
41								3.771	-2.700	0.100
42										
43										
44										
45										

FIG. 6B4

Station 1

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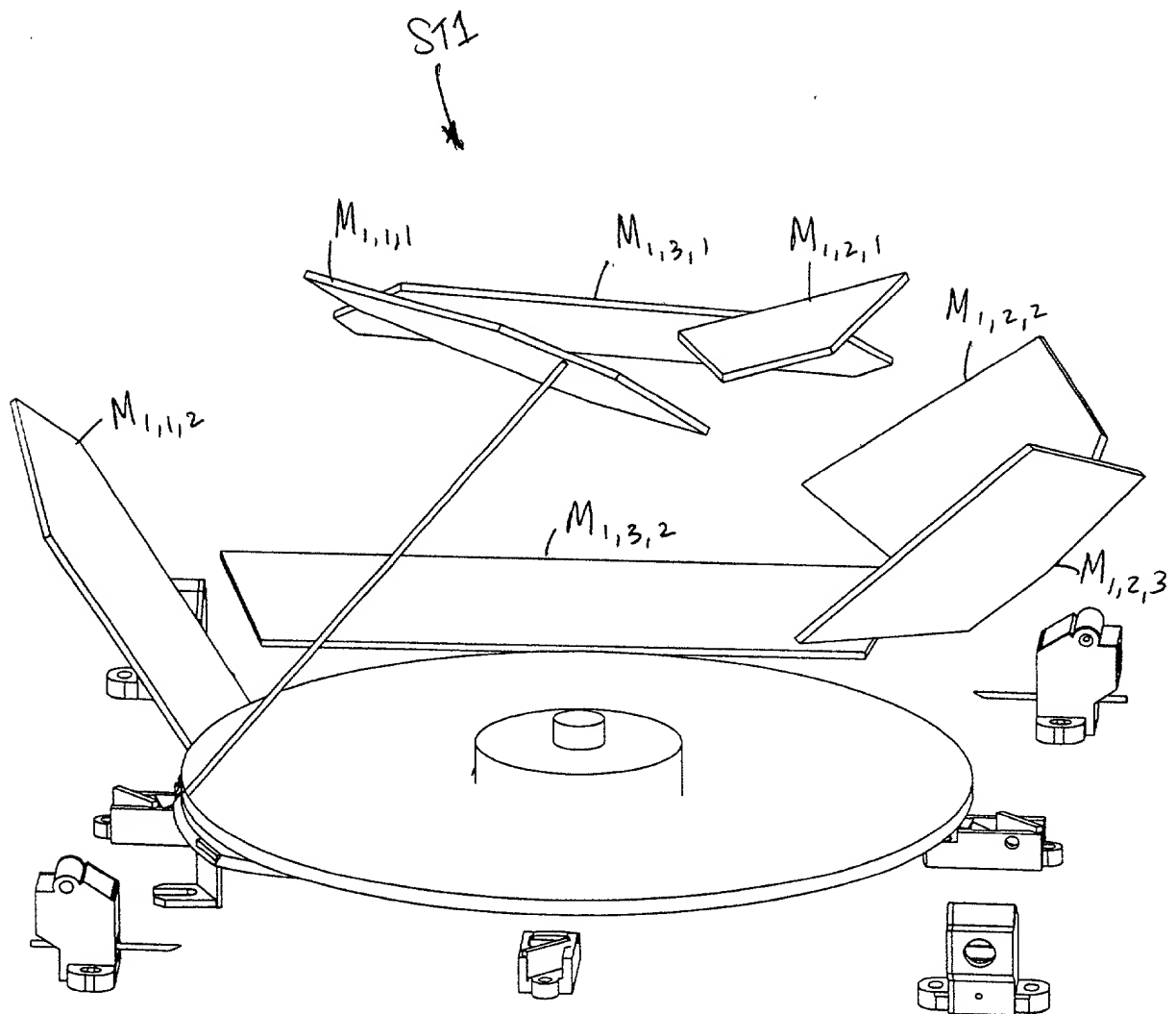


FIG.6C1

1. The first column contains the facet number.
 2. The second column contains the facet name.
 3. The third column contains the facet area.
 4. The fourth column contains the facet volume.
 5. The fifth column contains the facet mass.
 6. The sixth column contains the facet density.
 7. The seventh column contains the facet refractive index.
 8. The eighth column contains the facet dispersion.
 9. The ninth column contains the facet birefringence.
 10. The tenth column contains the facet optical activity.

N	O	P	Q	R	S	T	U	V	W	X
46	Facet	1								
47	x	y	z							
48	-0.616	0.000	0.788							
49	End									
50	x	y	z							
51	0.753	0.321	0.575							
52	-0.366	0.443	-0.819							
53	-0.574	0.468	0.672							
54										
55										
56	Mirror 1 Corners									
57	x	y	z							
58	4.250	1.500	2.547							
59	4.950	2.000	2.029							
60	5.150	1.800	1.851							
61	5.000	-1.800	1.656							
62	4.750	-1.950	1.844							
63	4.100	-1.500	2.405							
64										
65										

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FIG. 6C2

Station 1

FIG. 6C3

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Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
46	Facet	3								
47	x	y	z							
48	-0.616	0.000	0.788							
49	End									
50	x	y	z	x	y	z		x	y	z
51	0.714	0.290	0.638	0.743	0.000	0.669		0.709	-0.311	0.633
52	-0.438	0.416	-0.797	-0.487	0.134	-0.863		-0.485	-0.181	-0.855
53	-0.638	0.440	0.632	-0.704	0.161	0.692		-0.702	-0.155	0.695
54										
55										
56	Mirror 1 Corners									
57	x	y	z	x	y	z		x	y	z
58	4.250	1.500	2.547	3.150	2.450	0.030				
59	4.950	2.000	2.029	4.500	2.800	0.213				
60	5.150	1.800	1.851	4.350	-2.200	0.277				
61	5.000	-1.800	1.656	3.050	-1.850	0.089				
62	4.750	-1.950	1.844							
63	4.100	-1.500	2.405							
64										
65										

FIG. 6C4

Station 1

copy this page to the back of your book. It is a good idea to have a copy of this page in your book.

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FIG. 6C5

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
46	Facet	4									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.692	0.275	0.667								
52	-0.472	0.402	-0.784								
53	-0.667	0.426	0.611								
54											
55											
56		Mirror 1 Corners									
57	x	y	z								
58	4.250	1.500	2.547								
59	4.950	2.000	2.029								
60	5.150	1.800	1.851								
61	5.000	-1.800	1.656								
62	4.750	-1.950	1.844								
63	4.100	-1.500	2.405								
64											
65											

Station 1

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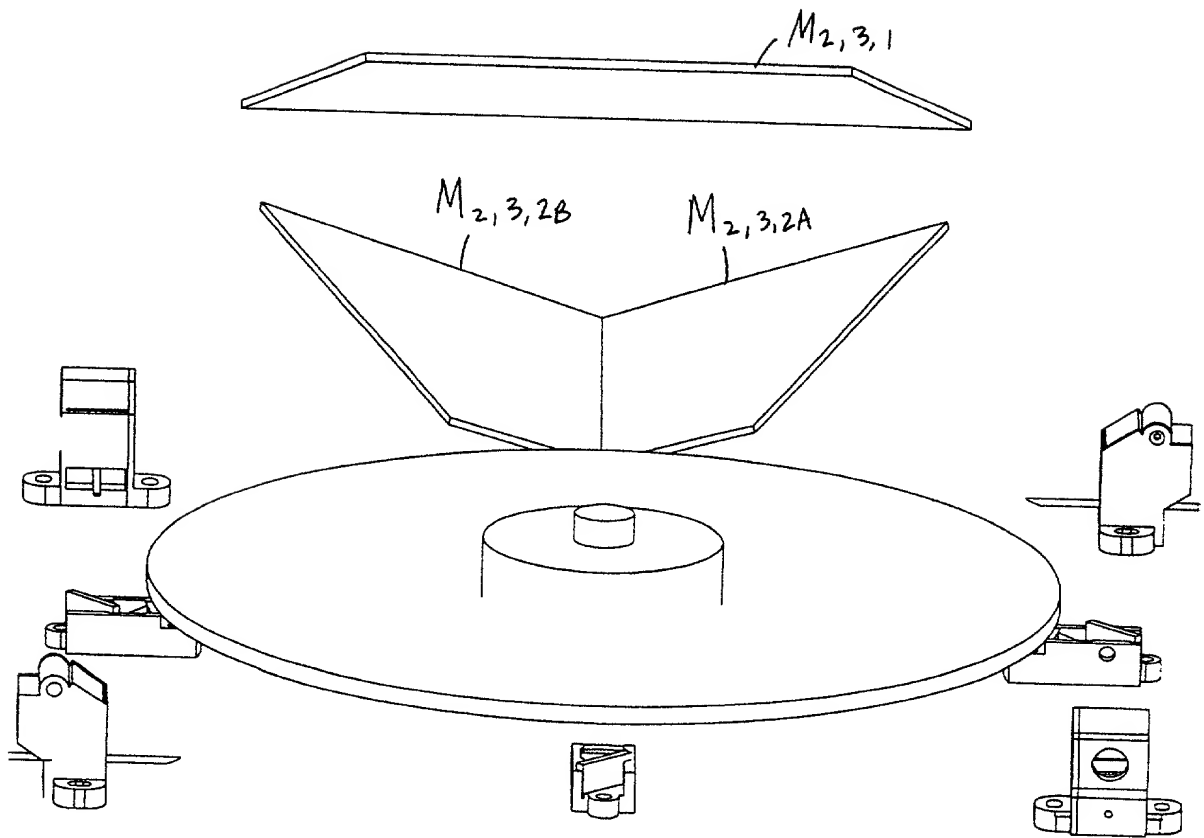


FIG. 6D1

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	N	O	P	Q	R	S	T	U	V	W	X
46	Facet	1									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.788	0.000	0.616		0.788	0.000	0.616		0.741	-0.367	0.562
52	-0.140	0.000	-0.990		-0.140	0.000	-0.990		-0.117	-0.367	-0.923
53	-0.595	0.448	0.667		-0.595	0.448	0.667		-0.590	0.098	0.801
54											
55											
56		Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
57	x	y	z		x	y	z		x	y	z
58	3.750	-1.600	2.509		3.000	0.000	-0.112				
59	5.100	-2.400	1.728		4.800	0.000	0.382				
60	5.100	2.400	1.728		5.071	-2.256	1.066				
61	3.750	1.600	2.509		5.071	-2.256	1.066				
62					3.060	-1.000	0.175				
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above										
70											
71					3.000	0.000	-0.112				
72					4.800	0.000	0.382				
73					5.071	2.256	1.066				
74					5.071	2.256	1.066				
75					3.060	1.000	0.175				
76											

FIG. 6D2

Station 2

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	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
46	Facet	2									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.766	0.000	0.643								
52	-0.175	0.000	-0.985								
53	-0.623	0.440	0.647								
54											
55											
56											
57	x	y	z								
58	3.750	-1.600	2.509								
59	5.100	-2.400	1.728								
60	5.100	2.400	1.728								
61	3.750	1.600	2.509								
62											
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo										
70											
71											
72											
73											
74											
75											
76											

FIG. 6D3

Station 2

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	A	B	C	D	E	F	G	H	I	J	K	L
46	Low Elevation	Facet	3									
47		x	y	z								
48	Vector from Module	-0.616	0.000	0.788								
49		End										
50		x	y	z								
51	Output Vectors From Disk	0.743	0.000	0.669								
52	First Mirror Reflected Directions	-0.209	0.000	-0.978								
53	Second Mirror Reflected Directions	-0.649	0.433	0.625								
54	Third Mirror Reflected Directions											
55												
56		Mirror 1 Corners										
57		x	y	z								
58	1	3.750	-1.600	2.509								
59	2	5.100	-2.400	1.728								
60	3	5.100	2.400	1.728								
61	4	3.750	1.600	2.509								
62	5											
63	6											
64	7											
65	8											
66												
67												
68												
69	Note: Special Case!	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above										
70												
71	Second Part of Mirror 2											
72												
73												
74												
75												
76												
77												

FIG. 6D4

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	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
46	Facet	4									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.719	0.000	0.695								
52	-0.243	0.000	-0.970								
53	-0.675	0.425	0.603								
54											
55											
56											
57	x	y	z								
58	3.750	-1.600	2.509								
59	5.100	-2.400	1.728								
60	5.100	2.400	1.728								
61	3.750	1.600	2.509								
62											
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo										
70											
71											
72											
73											
74											
75											
76											

FIG. 605

Station 2

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	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH
46	Facet	5									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.669	0.000	0.743								
52	-0.310	0.000	-0.951								
53	-0.724	0.407	0.557								
54											
55											
56											
57	x	y	z								
58	3.750	-1.600	2.509								
59	5.100	-2.400	1.728								
60	5.100	2.400	1.728								
61	3.750	1.600	2.509								
62											
63											
64											
65											
66											
67											
68											
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the abo										
70											
71											
72											
73											
74											
75											
76											

FIG. 6D6

214/335

	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX
46	Facet	6													
47	x	y	z												
48	-0.616	0.000	0.788												
49		End													
50	x	y	z												
51	0.616	0.000	0.788												
52	-0.376	0.000	-0.927												
53	-0.770	0.387	0.508												
54															
55															
56															
57	x	y	z												
58	3.750	-1.600	2.509												
59	5.100	-2.400	1.728												
60	5.100	2.400	1.728												
61	3.750	1.600	2.509												
62															
63															
64															
65															
66															
67															
68															
69	This station uses a split mirror for mirror #2. The second part of mirror 2 is the above mirrored about the y axis. I.e.:														
70															
71															
72															
73															
74															
75															
76															

FIG. 6D7

Station 2

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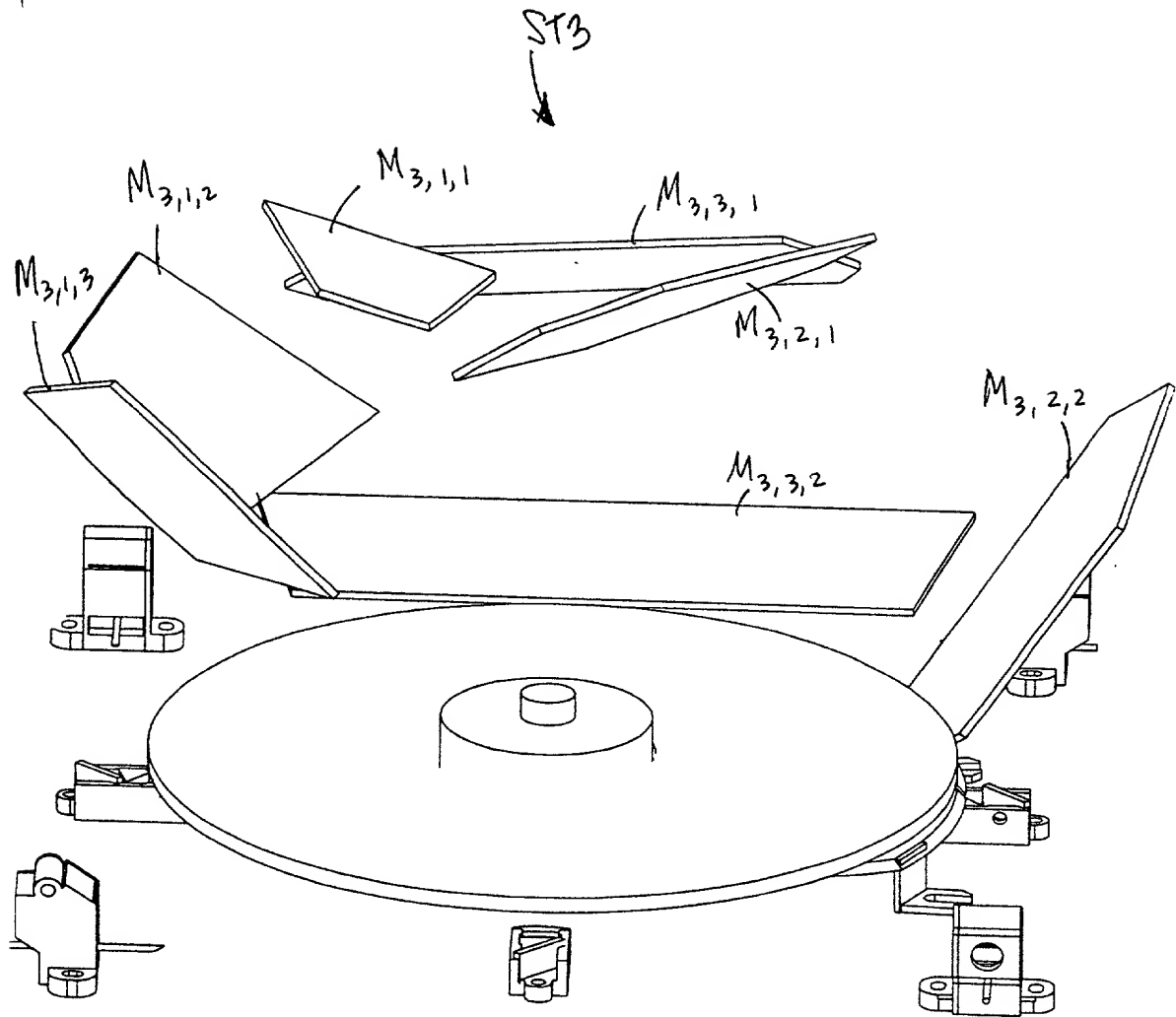


FIG. 6E1

216/335

	N	O	P	Q	R	S	T	U	V	W	X
1											
2											
3											
4	Facet	7									
5	x	y	z								
6	-0.616	0.000	0.788								
7		End									
8	x	y	z								
9	0.468	0.249	0.848								
10	0.408	0.675	-0.614								
11	-0.999	-0.012	-0.034								
12	-0.616	-0.531	0.582								
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

FIG. 6E2

Station 3

217/335

	A	B	C	D	E	F	G	H	I	J	K	L
1	Station 3											
2												
3												
4	High Elevation Left Skew	Facet	9									
5	(G2)	x	y	z								
6	Vector from Module	-0.616	0.000	0.788								
7			End				Middle				End	
8		x	y	z						x	y	z
9	Output Vectors From Disk	0.441	0.235	0.866		0.441	0.235	0.866		0.398	0.391	0.830
10	First Mirror Reflected Directions	0.380	0.673	-0.635		0.380	0.673	-0.635		0.343	0.784	-0.517
11	Second Mirror Reflected Directions	-0.998	0.000	-0.067		-0.998	0.000	-0.067		-0.991	0.133	0.033
12	Third Mirror Reflected Directions	-0.589	-0.553	0.589		-0.589	-0.553	0.589		-0.578	-0.426	0.697
13												
14			Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
15		x	y	z		x	y	z		x	y	z
16	1	2.550	1.630	2.650		4.000	2.630	0.049		3.746	3.750	1.000
17	2	4.150	2.267	2.770		4.900	1.400	0.775		1.371	3.300	2.100
18	3	3.950	-0.196	2.060		4.600	3.150	2.118		1.159	1.600	0.800
19	4	2.420	0.309	2.270		3.800	3.900	1.067		2.824	2.000	0.100
20	5									3.771	2.700	0.100
21	6											
22	7											
23	8											

FIG. 6E3

Station 3

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	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1											
2											
3											
4	Facet	11									
5	x	y	z								
6	-0.616	0.000	0.788								
7		End			Middle					End	
8	x	y	z		x	y	z		x	y	z
9	0.415	0.220	0.883		0.415	0.220	0.883		0.369	0.387	0.845
10	0.351	0.669	-0.655		0.351	0.669	-0.655		0.312	0.788	-0.530
11	-0.995	0.012	-0.099		-0.995	0.012	-0.099		-0.988	0.153	0.007
12	-0.562	-0.574	0.596		-0.562	-0.574	0.596		-0.550	-0.439	0.710
13											
14		Mirror 1 Corners			Mirror 2 Corners				Mirror 3 Corners		
15	x	y	z		x	y	z		x	y	z
16	2.550	1.630	2.650		4.000	2.630	0.049		3.746	3.750	1.000
17	4.150	2.267	2.770		4.900	1.400	0.775		1.371	3.300	2.100
18	3.950	-0.196	2.060		4.600	3.150	2.118		1.159	1.600	0.800
19	2.420	0.309	2.270		3.800	3.900	1.067		2.824	2.000	0.100
20									3.771	2.700	0.100
21											
22											
23											
24											

FIG. 6E4

Station 3

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ST3
↓

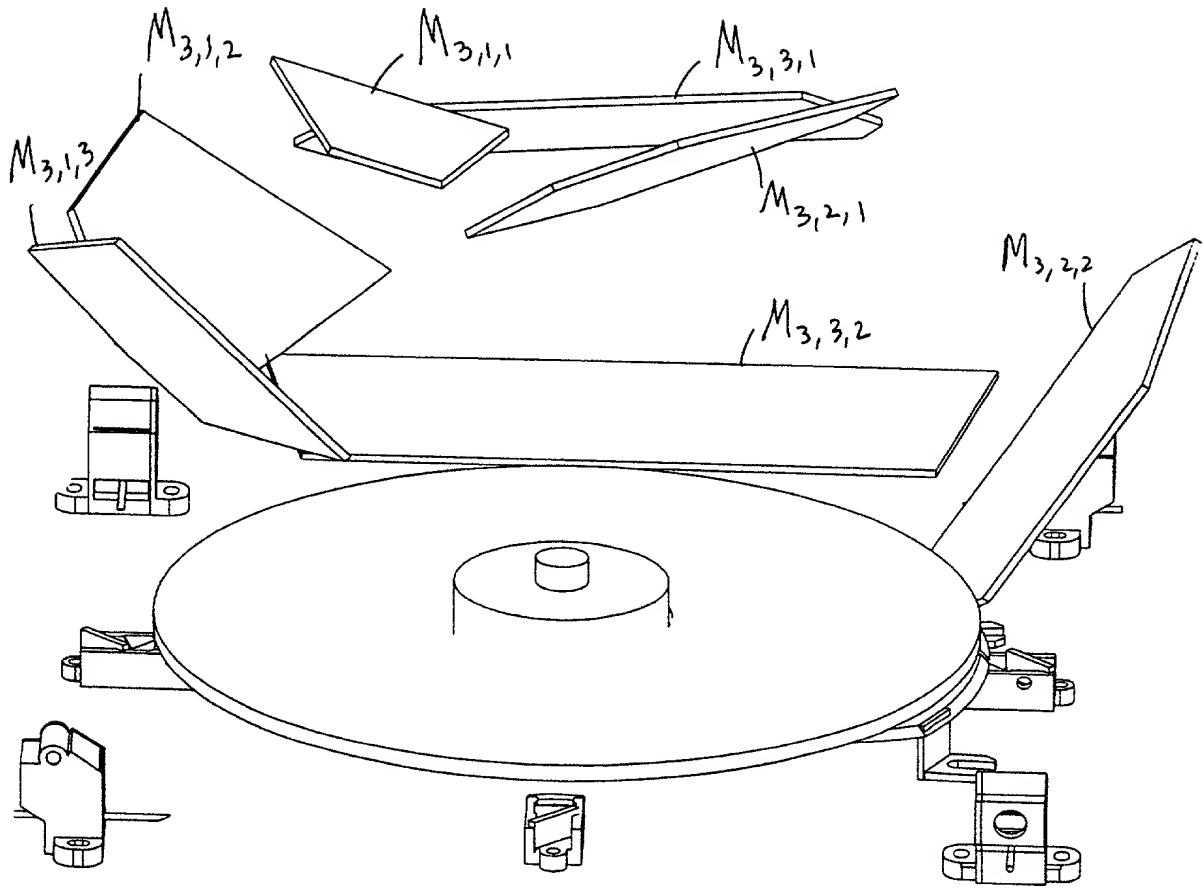


FIG. 6F1

220/335

	N	O	P	Q	R	S	T	U	V	W	X
25	Facet	8									
26	x	y	z								
27	-0.616	0.000	0.788								
28	End				Middle				End		
29	x	y	z		x	y	z		x	y	z
30	0.419	-0.416	0.807		0.468	-0.249	0.848		0.494	-0.048	0.868
31	-0.253	-0.917	-0.310		-0.316	-0.832	-0.455		-0.387	-0.704	-0.596
32	-0.469	0.414	0.781		-0.537	0.527	0.659		-0.603	0.626	0.494
33											
34											
35	Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners		
36	x	y	z		x	y	z		x	y	z
37	3.900	-2.436	2.770		1.700	-4.102	1.300				
38	4.100	-1.879	2.400		3.300	-4.400	1.980				
39	3.800	-0.137	1.800		3.400	-3.990	1.500				
40	3.150	0.737	1.800		2.300	-2.427	-0.625				
41	2.500	0.159	2.450		1.700	-2.524	-0.625				
42	2.650	-0.757	2.770		1.050	-3.101	-0.050				
43											
44											

Fig. 6F2

Station 3

221/335-

	A	B	C	D	E	F	G	H	I	J	K	L
25	High Elevation Right Skew	Facet	10									
26	(G1)	x	y	z								
27	Vector from Module	-0.616	0.000	0.788								
28			End				Middle				End	
29		x	y	z		x	y	z		x	y	z
30	Output Vectors From Disk	0.378	-0.445	0.812		0.441	-0.235	0.866		0.464	-0.068	0.883
31	First Mirror Reflected Directions	-0.269	-0.927	-0.263		-0.349	-0.823	-0.448		-0.408	-0.717	-0.565
32	Second Mirror Reflected Directions	-0.479	0.367	0.797		-0.566	0.512	0.647		-0.621	0.595	0.510
33	Third Mirror Reflected Directions											
34												
35												
36												
37		1	3.900	-2.436	2.770		1.700	-4.102	1.300			
38		2	4.100	-1.879	2.400		3.300	-4.400	1.980			
39		3	3.800	-0.137	1.800		3.400	-3.990	1.500			
40		4	3.150	0.737	1.800		2.300	-2.427	-0.625			
41		5	2.500	0.159	2.450		1.700	-2.524	-0.625			
42		6	2.650	-0.757	2.770		1.050	-3.101	-0.050			
43		7										
44		8										

Fig. 6F3

Station 3

222/335

	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
25	Facet	12									
26	x	y	z								
27	-0.616	0.000	0.788								
28		End									
29	x	y	z								
30	0.333	-0.476	0.814								
31	-0.284	-0.935	-0.211								
32	-0.487	0.316	0.814								
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											

FIG. 6F4

Station 3

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SYB

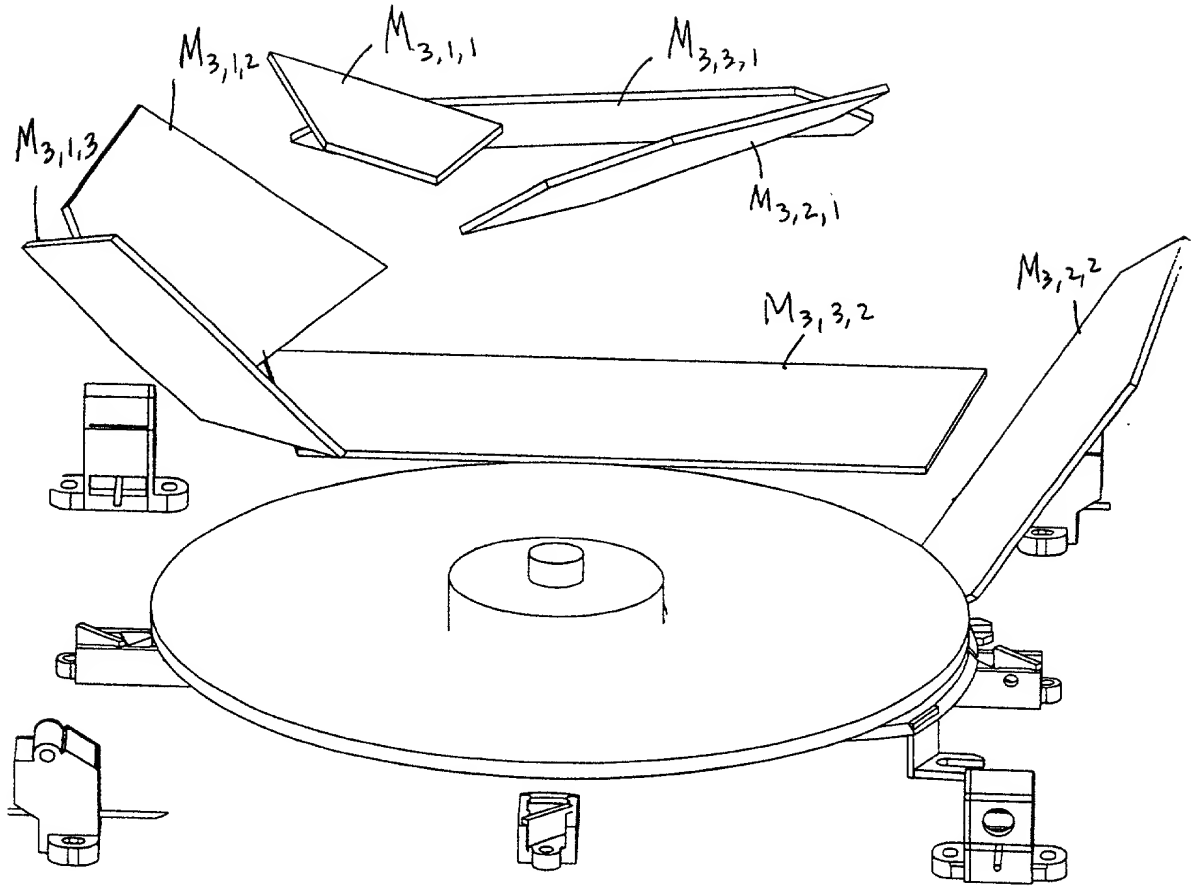


FIG. 6G1

224/335

	N	O	P	Q	R	S	T	U	V	W	X
46	Facet	1									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.753	-0.321	0.575		0.788	0.000	0.616		0.753	0.321	0.575
52	-0.366	-0.443	-0.819		-0.425	-0.132	-0.896		-0.421	0.193	-0.887
53	-0.574	-0.468	0.672		-0.653	-0.160	0.740		-0.648	0.165	0.743
54											
55											
56	Mirror 1 Corners					Mirror 2 Corners				Mirror 3 Corners	
57	x	y	z		x	y	z		x	y	z
58	4.250	-1.500	2.547		3.150	-2.450	0.030				
59	4.950	-2.000	2.029		4.500	-2.800	0.213				
60	5.150	-1.800	1.851		4.350	2.200	0.277				
61	5.000	1.800	1.656		3.050	1.850	0.089				
62	4.750	1.950	1.844								
63	4.100	1.500	2.405								
64											
65											

FIG. 692

Station 3

225/335

	A	B	C	D	E	F	G	H	I	J	K	L
46	Low Elevation	Facet	2									
47	(G3)	x	y	z								
48	Vector from Module	-0.616	0.000	0.788								
49			End									
50		x	y	z								
51	Output Vectors From Disk	0.734	-0.305	0.607								
52	First Mirror Reflected Directions	-0.402	-0.429	-0.809								
53	Second Mirror Reflected Directions	-0.607	-0.454	0.653								
54	Third Mirror Reflected Directions											
55												
56												
57		x	y	z								
58		1	4.250	-1.500	2.547							
59		2	4.950	-2.000	2.029							
60		3	5.150	-1.800	1.851							
61		4	5.000	1.800	1.656							
62		5	4.750	1.950	1.844							
63		6	4.100	1.500	2.405							
64		7										
65		8										
66												

Fig. 6G3

Station 3

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	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
46	Facet	4									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.692	-0.275	0.667		0.719	0.000	0.695		0.686	0.307	0.660
52	-0.472	-0.402	-0.784		-0.517	-0.135	-0.846		-0.516	0.176	-0.838
53	-0.667	-0.426	0.611		-0.728	-0.161	0.666		-0.727	0.151	0.670
54											
55											
56		Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
57	x	y	z		x	y	z		x	y	z
58	4.250	-1.500	2.547		3.150	-2.450	0.030				
59	4.950	-2.000	2.029		4.500	-2.800	0.213				
60	5.150	-1.800	1.851		4.350	2.200	0.277				
61	5.000	1.800	1.656		3.050	1.850	0.089				
62	4.750	1.950	1.844								
63	4.100	1.500	2.405								
64											
65											

Fig. 645

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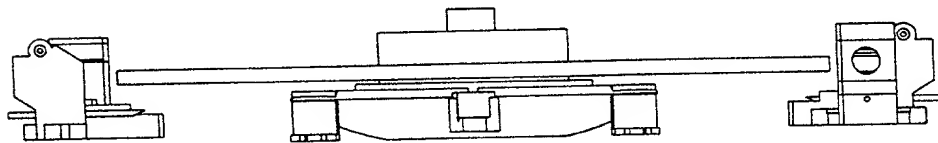
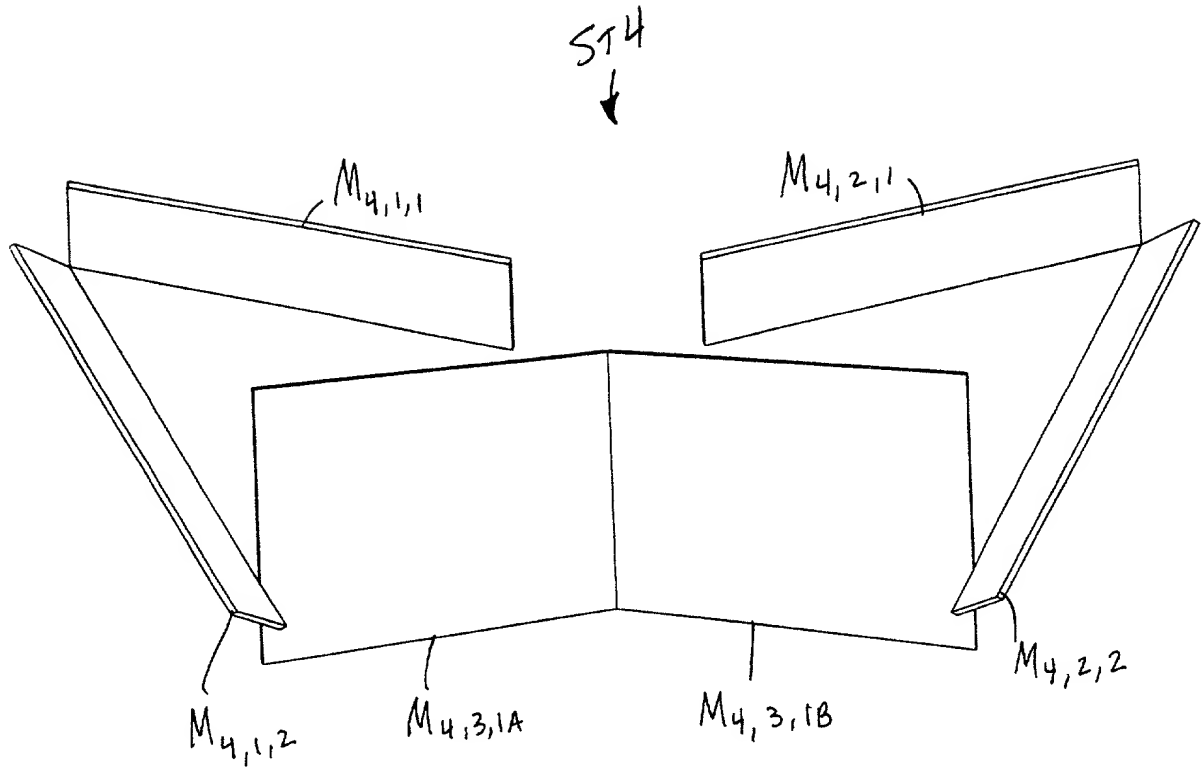


FIG. 6H1

1. The first column contains the station numbers.
 2. The second column contains the station names.
 3. The third column contains the station coordinates.
 4. The fourth column contains the station elevations.
 5. The fifth column contains the station descriptions.
 6. The sixth column contains the station remarks.
 7. The seventh column contains the station notes.
 8. The eighth column contains the station comments.
 9. The ninth column contains the station details.
 10. The tenth column contains the station information.
 11. The eleventh column contains the station data.
 12. The twelfth column contains the station facts.
 13. The thirteenth column contains the station figures.
 14. The fourteenth column contains the station tables.
 15. The fifteenth column contains the station diagrams.
 16. The sixteenth column contains the station drawings.
 17. The seventeenth column contains the station plans.
 18. The eighteenth column contains the station maps.
 19. The nineteenth column contains the station charts.
 20. The twentieth column contains the station graphs.
 21. The twenty-first column contains the station images.
 22. The twenty-second column contains the station photos.
 23. The twenty-third column contains the station videos.
 24. The twenty-fourth column contains the station audio.
 25. The twenty-fifth column contains the station text.
 26. The twenty-sixth column contains the station files.
 27. The twenty-seventh column contains the station folders.
 28. The twenty-eighth column contains the station drives.
 29. The twenty-ninth column contains the station networks.
 30. The thirtieth column contains the station servers.
 31. The thirty-first column contains the station databases.
 32. The thirty-second column contains the station applications.
 33. The thirty-third column contains the station services.
 34. The thirty-fourth column contains the station protocols.
 35. The thirty-fifth column contains the station standards.
 36. The thirty-sixth column contains the station guidelines.
 37. The thirty-seventh column contains the station policies.
 38. The thirty-eighth column contains the station procedures.
 39. The thirty-ninth column contains the station processes.
 40. The fortieth column contains the station methods.
 41. The forty-first column contains the station techniques.
 42. The forty-second column contains the station tools.
 43. The forty-third column contains the station equipment.
 44. The forty-fourth column contains the station materials.
 45. The forty-fifth column contains the station supplies.
 46. The forty-sixth column contains the station resources.
 47. The forty-seventh column contains the station assets.
 48. The forty-eighth column contains the station liabilities.
 49. The forty-ninth column contains the station equity.
 50. The fiftieth column contains the station debt.
 51. The fifty-first column contains the station income.
 52. The fifty-second column contains the station expenses.
 53. The fifty-third column contains the station profits.
 54. The fifty-fourth column contains the station losses.
 55. The fifty-fifth column contains the station net income.
 56. The fifty-sixth column contains the station net loss.
 57. The fifty-seventh column contains the station net profit.
 58. The fifty-eighth column contains the station net loss.
 59. The fifty-ninth column contains the station net income.
 60. The sixtieth column contains the station net loss.
 61. The sixty-first column contains the station net profit.
 62. The sixty-second column contains the station net loss.
 63. The sixty-third column contains the station net income.
 64. The sixty-fourth column contains the station net loss.
 65. The sixty-fifth column contains the station net profit.
 66. The sixty-sixth column contains the station net loss.
 67. The sixty-seventh column contains the station net income.
 68. The sixty-eighth column contains the station net loss.
 69. The sixty-ninth column contains the station net profit.
 70. The seventieth column contains the station net loss.
 71. The seventy-first column contains the station net income.
 72. The seventy-second column contains the station net loss.
 73. The seventy-third column contains the station net profit.
 74. The seventy-fourth column contains the station net loss.
 75. The seventy-fifth column contains the station net income.
 76. The seventy-sixth column contains the station net loss.
 77. The seventy-seventh column contains the station net profit.
 78. The seventy-eighth column contains the station net loss.
 79. The seventy-ninth column contains the station net income.
 80. The eightieth column contains the station net loss.
 81. The eighty-first column contains the station net profit.
 82. The eighty-second column contains the station net loss.
 83. The eighty-third column contains the station net income.
 84. The eighty-fourth column contains the station net loss.
 85. The eighty-fifth column contains the station net profit.
 86. The eighty-sixth column contains the station net loss.
 87. The eighty-seventh column contains the station net income.
 88. The eighty-eighth column contains the station net loss.
 89. The eighty-ninth column contains the station net profit.
 90. The ninetieth column contains the station net loss.
 91. The ninety-first column contains the station net income.
 92. The ninety-second column contains the station net loss.
 93. The ninety-third column contains the station net profit.
 94. The ninety-fourth column contains the station net loss.
 95. The ninety-fifth column contains the station net income.
 96. The ninety-sixth column contains the station net loss.
 97. The ninety-seventh column contains the station net profit.
 98. The ninety-eighth column contains the station net loss.
 99. The ninety-ninth column contains the station net income.
 100. The one hundredth column contains the station net loss.

	N	O	P	Q	R	S	T	U	V	W	X
1											
2											
3											
4	Facet	7									
5	x	y	z								
6	-0.616	0.000	0.788								
7		End									
8	x	y	z								
9	0.399	0.468	0.789								
10	-0.433	0.736	-0.519								
11	-0.737	-0.585	0.339								
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											

FIG. 6H2

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FIG. 6H3

Station 4

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	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1											
2											
3											
4	Facet	11									
5	x	y	z								
6	-0.616	0.000	0.788								
7		End									
8	x	y	z								
9	0.332	0.478	0.813								
10	-0.482	0.741	-0.467								
11	-0.773	-0.526	0.356								
12											
13											
14											
15	x	y	z								
16	4.900	0.800	6.409								
17	6.100	0.800	5.645								
18	6.000	4.500	6.468								
19	4.900	4.500	7.168								
20											
21											
22											
23											
24											

FIG. 6H4

Station 4

232/335

5TH
↓

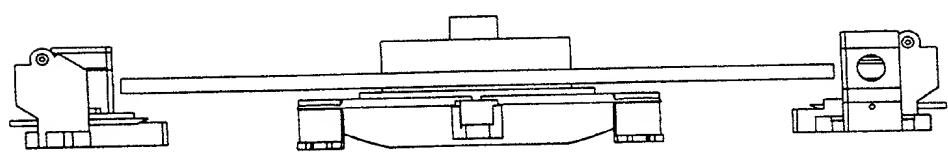
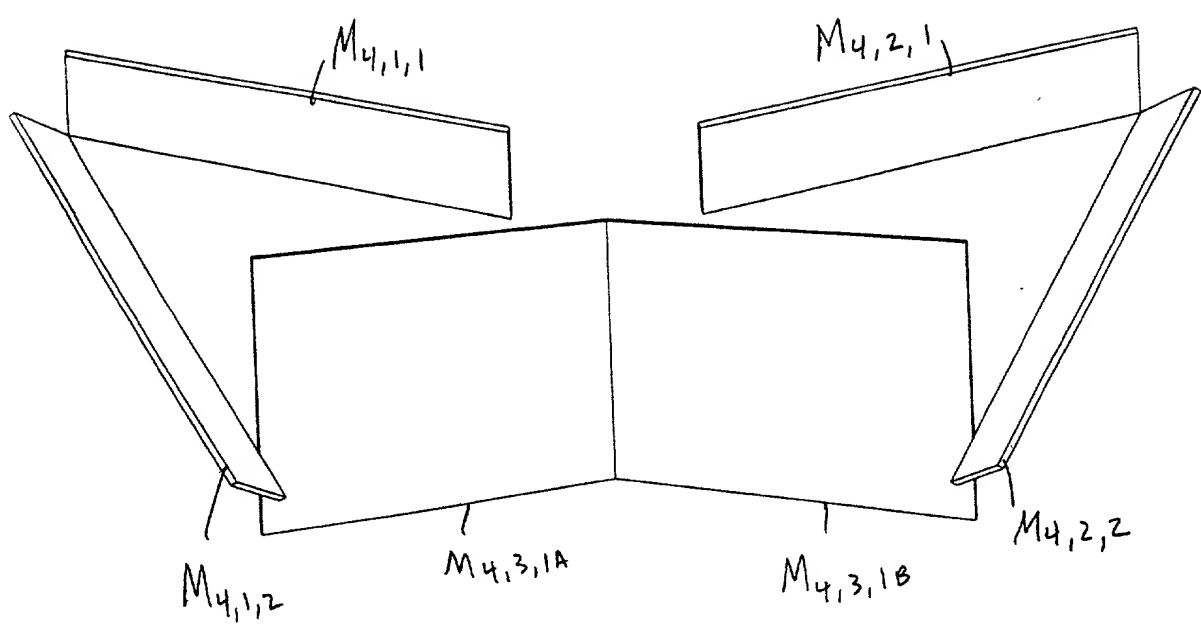


FIG. 6I1

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	N	O	P	Q	R	S	T	U	V	W	X
25 Facet		8									
26	x	y	z								
27	-0.616	0.000	0.788								
28	End			Middle			End				
29	x	y	z	x	y	z	x	y	z		
30	0.481	-0.180	0.858	0.468	-0.249	0.848	0.399	-0.468	0.789		
31	-0.511	-0.500	-0.700	-0.495	-0.559	-0.665	-0.433	-0.736	-0.519		
32	-0.771	0.636	0.038	-0.768	0.631	0.108	-0.737	0.585	0.339		
33											
34	Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners				
35	x	y	z	x	y	z	x	y	z		
36	4.900	-0.800	6.409	2.850	-3.200	3.370					
37	6.100	-0.800	5.645	4.200	-2.800	3.231					
38	6.000	-4.500	6.468	5.950	-4.500	6.464					
39	4.900	-4.500	7.168	4.600	-4.950	6.680					
40											
41											
42											
43											
44											

FIG. 6I2

234/335

A		B	C	D	E	F	G	H	I	J	K	L
25	High Elevation Right Skew	Facet	10									
26		x	y	z								
27	Vector from Module	-0.616	0.000	0.788								
28		End			Middle			End				
29		x	y	z		x	y	z		x	y	z
30	Output Vectors From Disk	0.452	-0.177	0.874		0.441	-0.235	0.866		0.366	-0.474	0.801
31	First Mirror Reflected Directions	-0.538	-0.496	-0.681		-0.525	-0.546	-0.653		-0.458	-0.739	-0.494
32	Second Mirror Reflected Directions	-0.792	0.610	0.037		-0.789	0.606	0.096		-0.755	0.556	0.348
33	Third Mirror Reflected Directions											
34		Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners				
35		x	y	z		x	y	z		x	y	z
36		1	4.900	-0.800	6.409		2.850	-3.200	3.370			
37		2	6.100	-0.800	5.645		4.200	-2.800	3.231			
38		3	6.000	-4.500	6.468		5.950	-4.500	6.464			
39		4	4.900	-4.500	7.168		4.600	-4.950	6.680			
40		5										
41		6										
42		7										
43		8										
44												

F14. 6I3

Station 4

1. The first step is to determine the coordinates of the vertices of the polygon. In this case, the vertices are labeled A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
25	Facet	12									
26	x	y	z								
27	-0.616	0.000	0.788								
28		End									
29	x	y	z								
30	0.422	-0.176	0.889								
31	-0.564	-0.494	-0.661								
32	-0.811	0.583	0.039								
33											
34											
35		Mirror 1 Corners									
36	x	y	z								
37	4.900	-0.800	6.409								
38	6.100	-0.800	5.645								
39	6.000	-4.500	6.468								
40	4.900	-4.500	7.168								
41											
42											
43											
44											

FIG. 6I4

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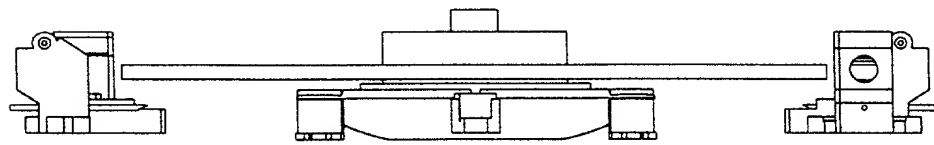
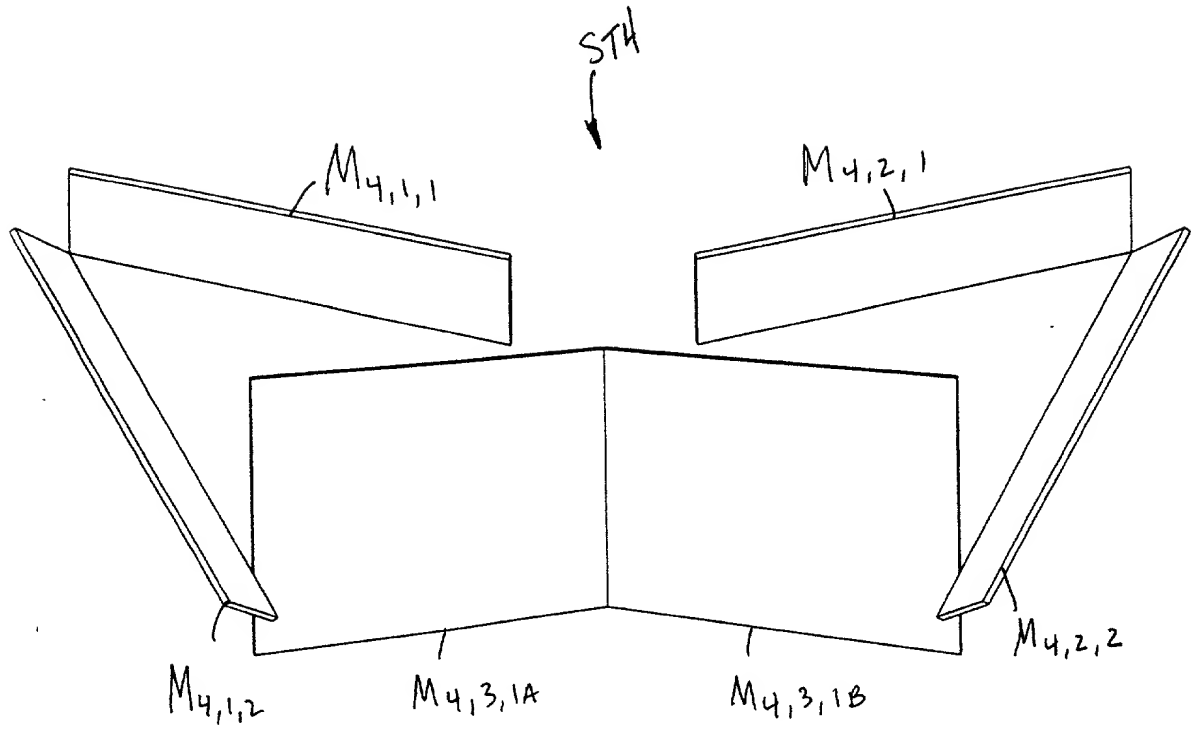


FIG. 6J1

1. The first two columns are the station number and the station name.
 2. The next three columns are the coordinates of the station in feet.
 3. The next three columns are the coordinates of the station in meters.
 4. The next three columns are the coordinates of the station in feet.
 5. The next three columns are the coordinates of the station in meters.

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	N	O	P	Q	R	S	T	U	V	W	X
46	Facet	1									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.788	0.001	0.616								
52	-0.938	0.335	0.087								
53											
54											
55											
56		Mirror 1 Corners									
57	x	y	z								
58	6.700	0.000	5.608								
59	7.400	0.000	3.322								
60	6.950	-3.000	2.897								
61	6.200	-3.000	5.345								
62											
63											
64											
65											
66											

FIG. 6J2

copy from page 11 of 11
for the 6th of 11 11 11

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	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
46	Facet	2									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End									
50	x	y	z								
51	0.766	0.000	0.643								
52	-0.936	0.329	0.121								
53											
54											
55											
56		Mirror 1 Corners									
57	x	y	z								
58	6.700	0.000	5.608								
59	7.400	0.000	3.322								
60	6.950	-3.000	2.897								
61	6.200	-3.000	5.345								
62											
63											
64											
65											
66											

FIG. 6J3

Station 4

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	A	B	C	D	E	F	G	H	I	J	K	L
46	Low Elevation	Facet	3									
47		x	y	z								
48	Vector from Module	-0.616	0.000	0.788								
49			End									
50		x	y	z								
51	Output Vectors From Disk	0.743	0.000	0.669								
52	First Mirror Reflected Directions	-0.933	0.324	0.156								
53	Second Mirror Reflected Directions											
54	Third Mirror Reflected Directions											
55												
56			Mirror 1 Corners									
57		x	y	z								
58		1	6.700	0.000	5.608							
59		2	7.400	0.000	3.322							
60		3	6.950	-3.000	2.897							
61		4	6.200	-3.000	5.345							
62		5										
63		6										
64		7										
65		8										
66												

FIG. 6J4

1. The first column contains the station number.
 2. The second column contains the station name.
 3. The third column contains the station coordinates (X, Y, Z).
 4. The fourth column contains the station elevation (AV).
 5. The fifth column contains the station type (AL, AM, AN, AP, AQ, AR, AS, AT, AU, AV).

	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
46	Facet	4									
47	x	y	z								
48	-0.616	0.000	0.788								
49	End			Middle			End				
50	x	y	z		x	y	z		x	y	z
51	0.719	0.000	0.695		0.719	0.000	0.695		0.664	-0.395	0.635
52	-0.929	0.319	0.190		-0.929	0.319	0.190		-0.989	-0.075	0.129
53											
54											
55	Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners				
56	x	y	z		x	y	z		x	y	z
57	6.700	0.000	5.608								
58	7.400	0.000	3.322								
59	6.950	-3.000	2.897								
60	6.200	-3.000	5.345								
61											
62											
63											
64											
65											
66											

FIG. 6J5

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	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH
46	Facet	5									
47	x	y	z								
48	-0.616	0.000	0.788								
49		End				Middle				End	
50	x	y	z		x	y	z		x	y	z
51	0.669	0.000	0.743		0.669	0.000	0.743		0.621	-0.362	0.695
52	-0.916	0.307	0.257		-0.916	0.307	0.257		-0.977	-0.052	0.206
53											
54											
55											
56		Mirror 1 Corners				Mirror 2 Corners				Mirror 3 Corners	
57	x	y	z		x	y	z		x	y	z
58	6.700	0.000	5.608								
59	7.400	0.000	3.322								
60	6.950	-3.000	2.897								
61	6.200	-3.000	5.345								
62											
63											
64											
65											

FIG. 6J6

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	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
46	Facet	6										
47	x	y	z									
48	-0.616	0.000	0.788									
49	End			Middle			End					
50	x	y	z		x	y	z		x	y	z	
51	0.616	0.000	0.788		0.616	0.000	0.788		0.561	-0.380	0.735	
52	-0.900	0.293	0.324		-0.900	0.293	0.324		-0.959	-0.086	0.270	
53												
54												
55	Mirror 1 Corners			Mirror 2 Corners			Mirror 3 Corners					
56	x	y	z		x	y	z		x	y	z	
57	6.700	0.000	5.608									
58	7.400	0.000	3.322									
59	6.950	-3.000	2.897									
60	6.200	-3.000	5.345									
61												
62												
63												
64												
65												

FIG. 6J7

Station 4

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LEFT SKEW
(HIGH ELEVATION)

RIGHT SKEW
(HIGH ELEVATION)

NO SKEW
(LOW ELEVATION)

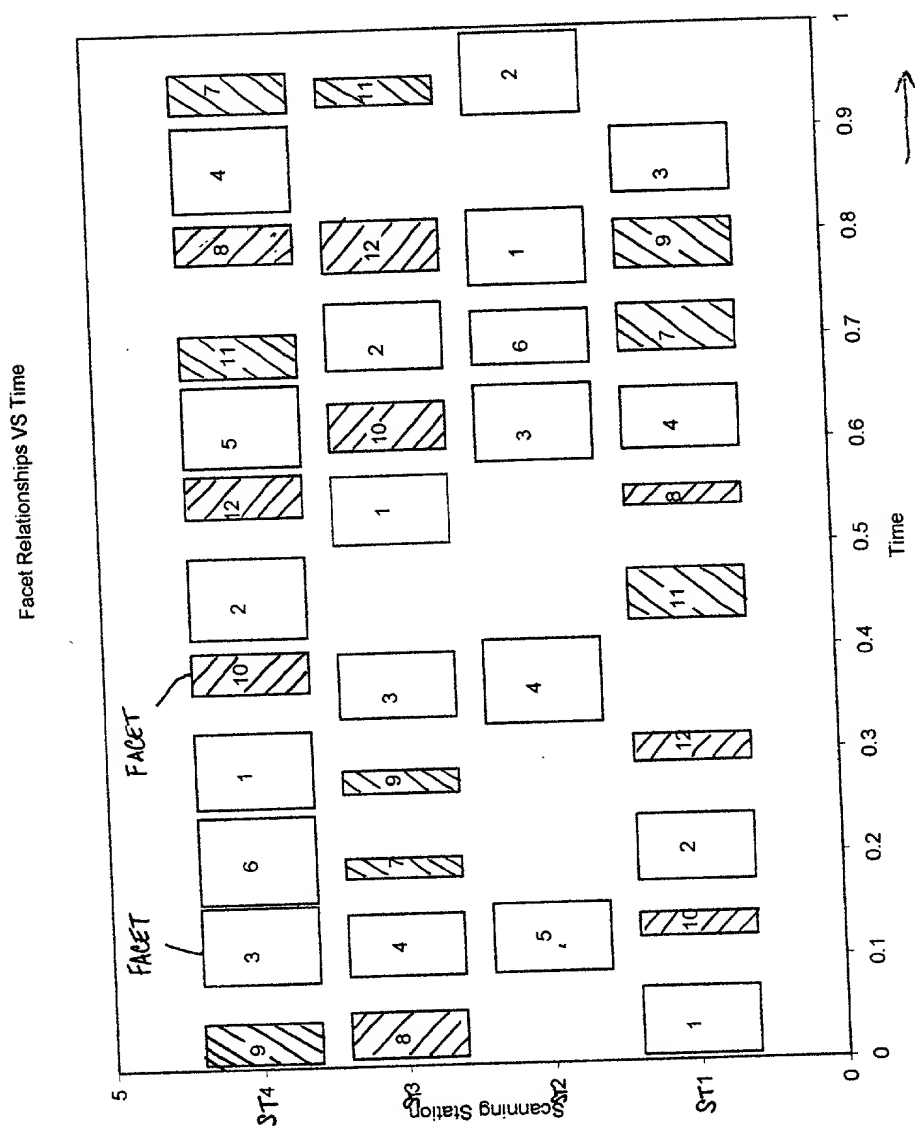


Fig. 6K

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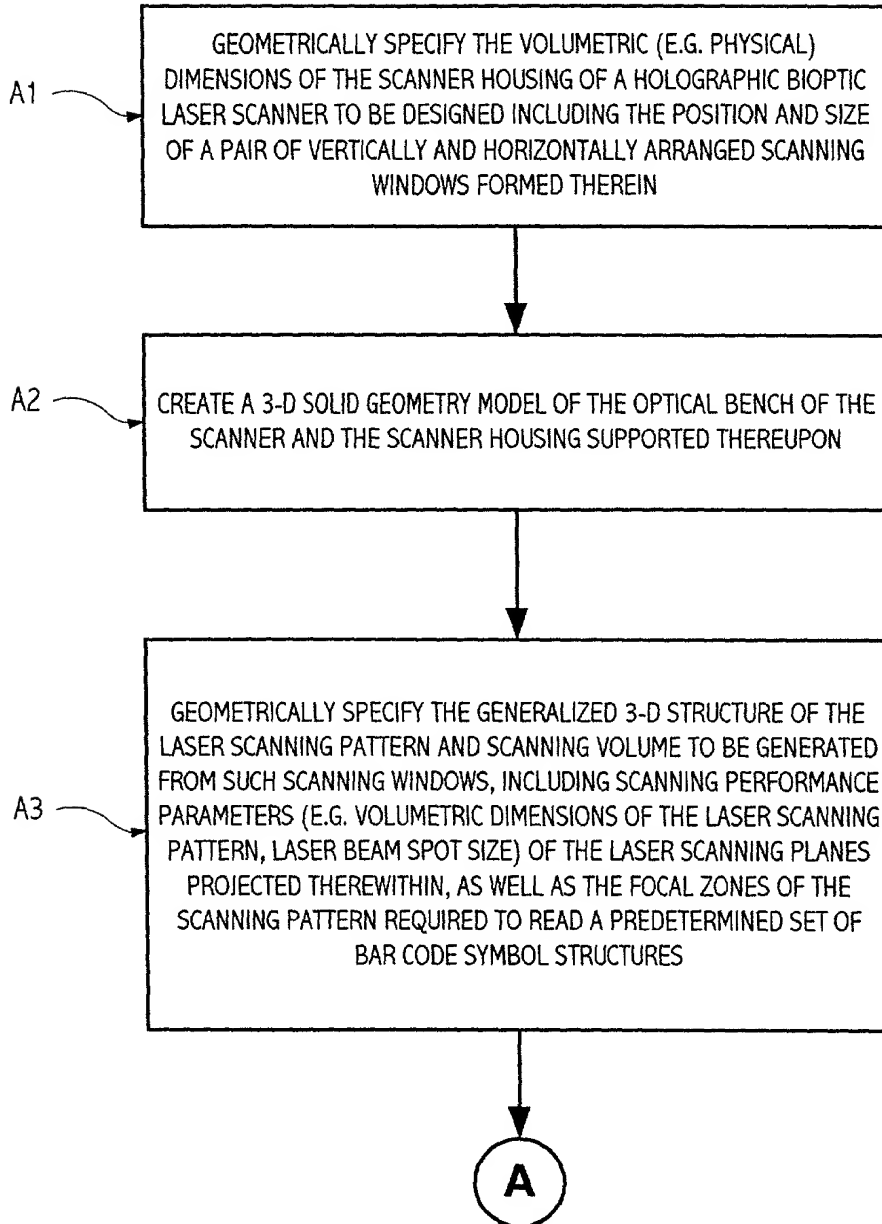


FIG. 7A

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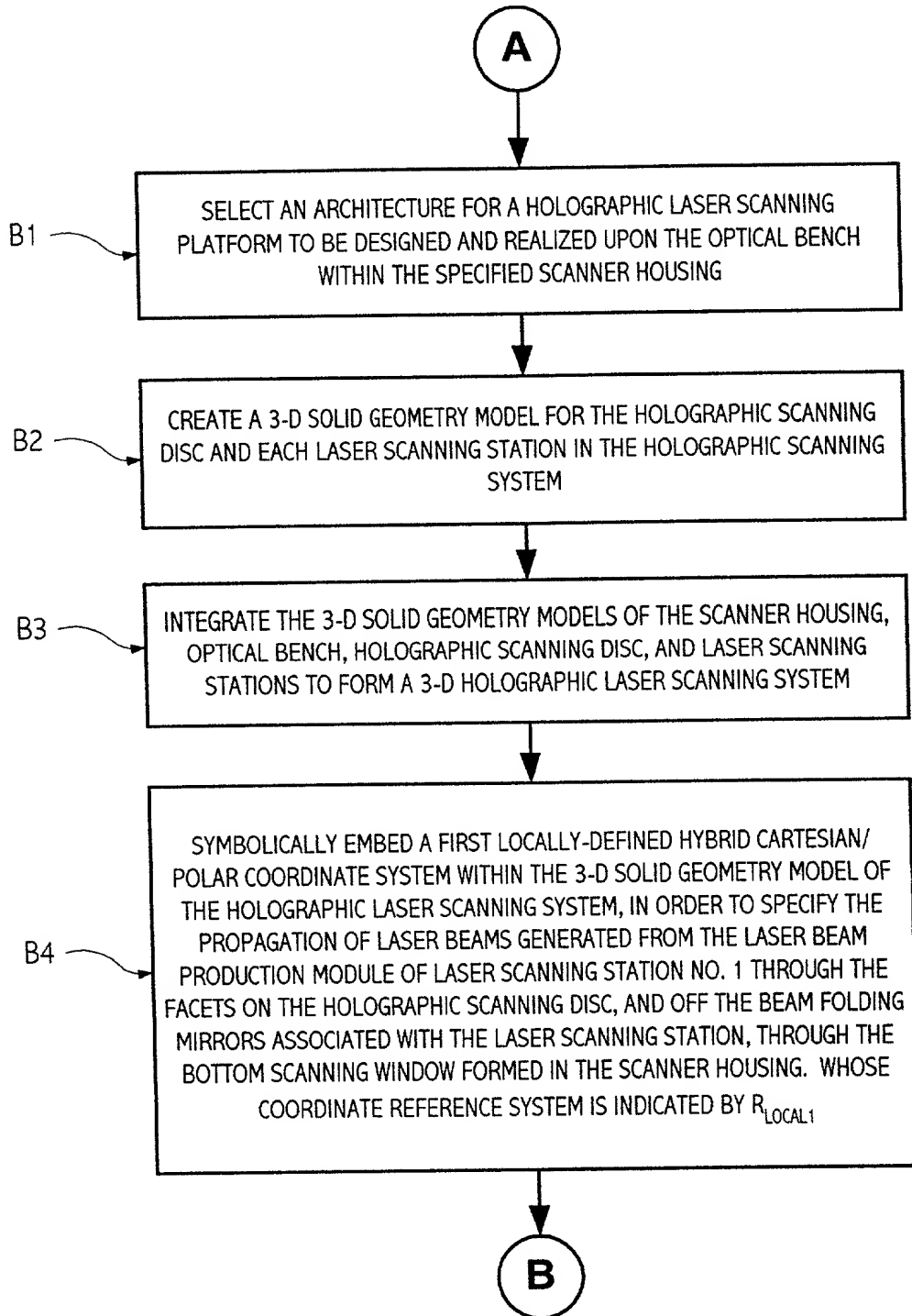


FIG. 7B

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B

B5

SYMBOLICALLY EMBED A SECOND LOCALLY-DEFINED HYBRID CARTESIAN/
POLAR COORDINATE SYSTEM WITHIN THE 3-D SOLID GEOMETRY MODEL OF
THE HOLOGRAPHIC LASER SCANNING SYSTEM, IN ORDER TO SPECIFY THE
PROPAGATION OF LASER BEAMS GENERATED FROM THE LASER BEAM
PRODUCTION MODULE OF LASER SCANNING STATION NO. 2 THROUGH THE
FACETS ON THE HOLOGRAPHIC SCANNING DISC, AND OFF THE BEAM FOLDING
MIRRORS ASSOCIATED WITH THE LASER SCANNING STATION, THROUGH THE
BOTTOM SCANNING WINDOW FORMED IN THE SCANNER HOUSING. WHOSE
COORDINATE REFERENCE SYSTEM IS INDICATED BY R_{LOCAL2}

B6

SYMBOLICALLY EMBED A THIRD LOCALLY-DEFINED HYBRID CARTESIAN/
POLAR COORDINATE SYSTEM WITHIN THE 3-D SOLID GEOMETRY MODEL OF THE
HOLOGRAPHIC LASER SCANNING SYSTEM, IN ORDER TO SPECIFY THE
PROPAGATION OF LASER BEAMS GENERATED FROM THE LASER BEAM
PRODUCTION MODULE OF LASER SCANNING STATION NO. 3 THROUGH THE
FACETS ON THE HOLOGRAPHIC SCANNING DISC, AND OFF THE BEAM FOLDING
MIRRORS ASSOCIATED WITH THE LASER SCANNING STATION, THROUGH THE
SIDE SCANNING WINDOW FORMED IN THE SCANNER HOUSING. WHOSE
COORDINATE REFERENCE SYSTEM IS INDICATED BY R_{LOCAL3}

B7

SYMBOLICALLY EMBED A FOURTH LOCALLY-DEFINED HYBRID CARTESIAN/
POLAR COORDINATE SYSTEM WITHIN THE 3-D SOLID GEOMETRY MODEL OF
THE HOLOGRAPHIC LASER SCANNING SYSTEM, IN ORDER TO SPECIFY THE
PROPAGATION OF LASER BEAMS GENERATED FROM THE LASER BEAM
PRODUCTION MODULE OF LASER SCANNING STATION NO. 4 THROUGH THE
FACETS ON THE HOLOGRAPHIC SCANNING DISC, AND OFF THE BEAM FOLDING
MIRRORS ASSOCIATED WITH THE LASER SCANNING STATION, THROUGH THE
SIDE SCANNING WINDOW FORMED IN THE SCANNER HOUSING. WHOSE
COORDINATE REFERENCE SYSTEM IS INDICATED BY R_{LOCAL4}

C

FIG. 7C

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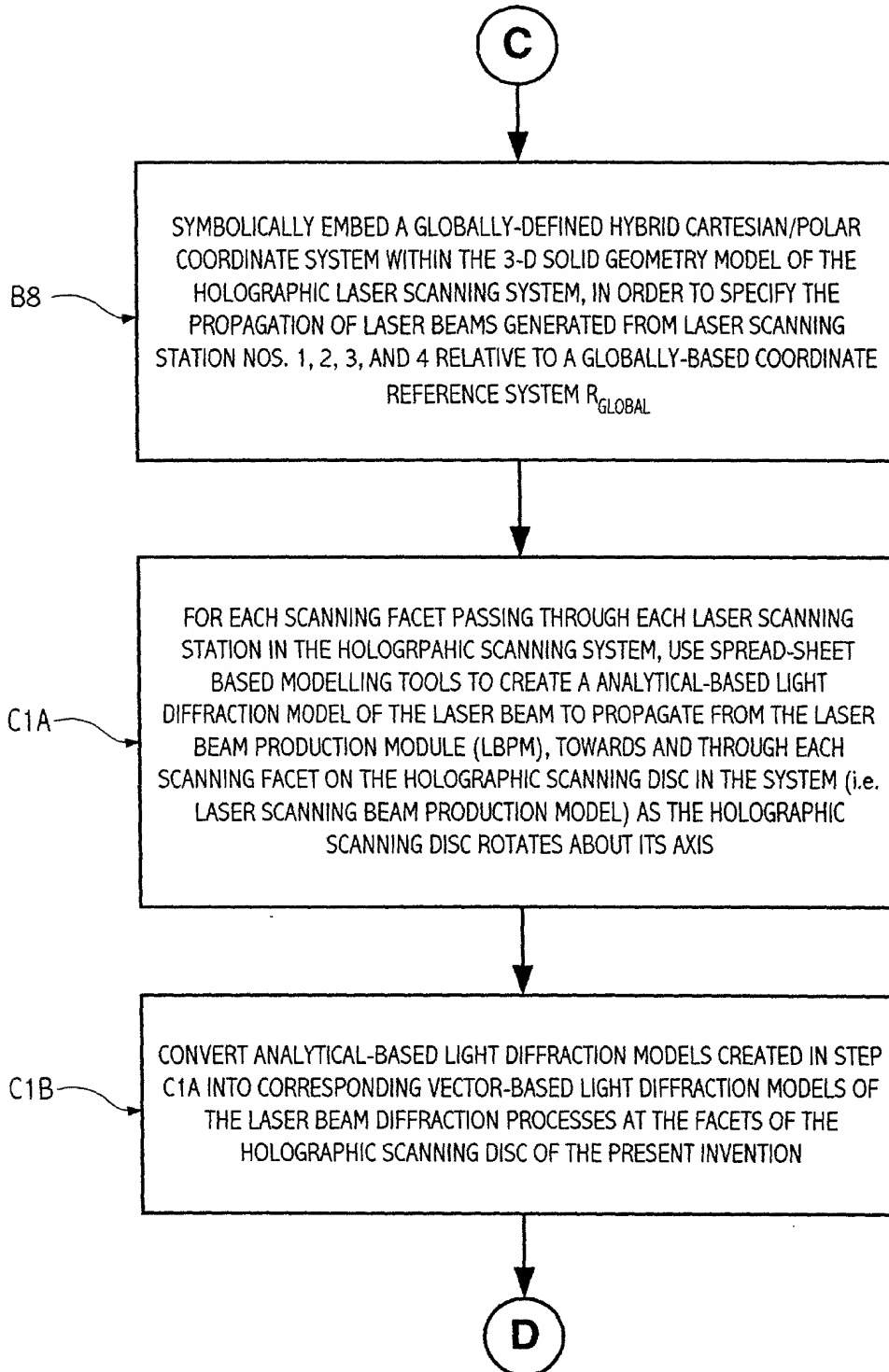


FIG. 7D

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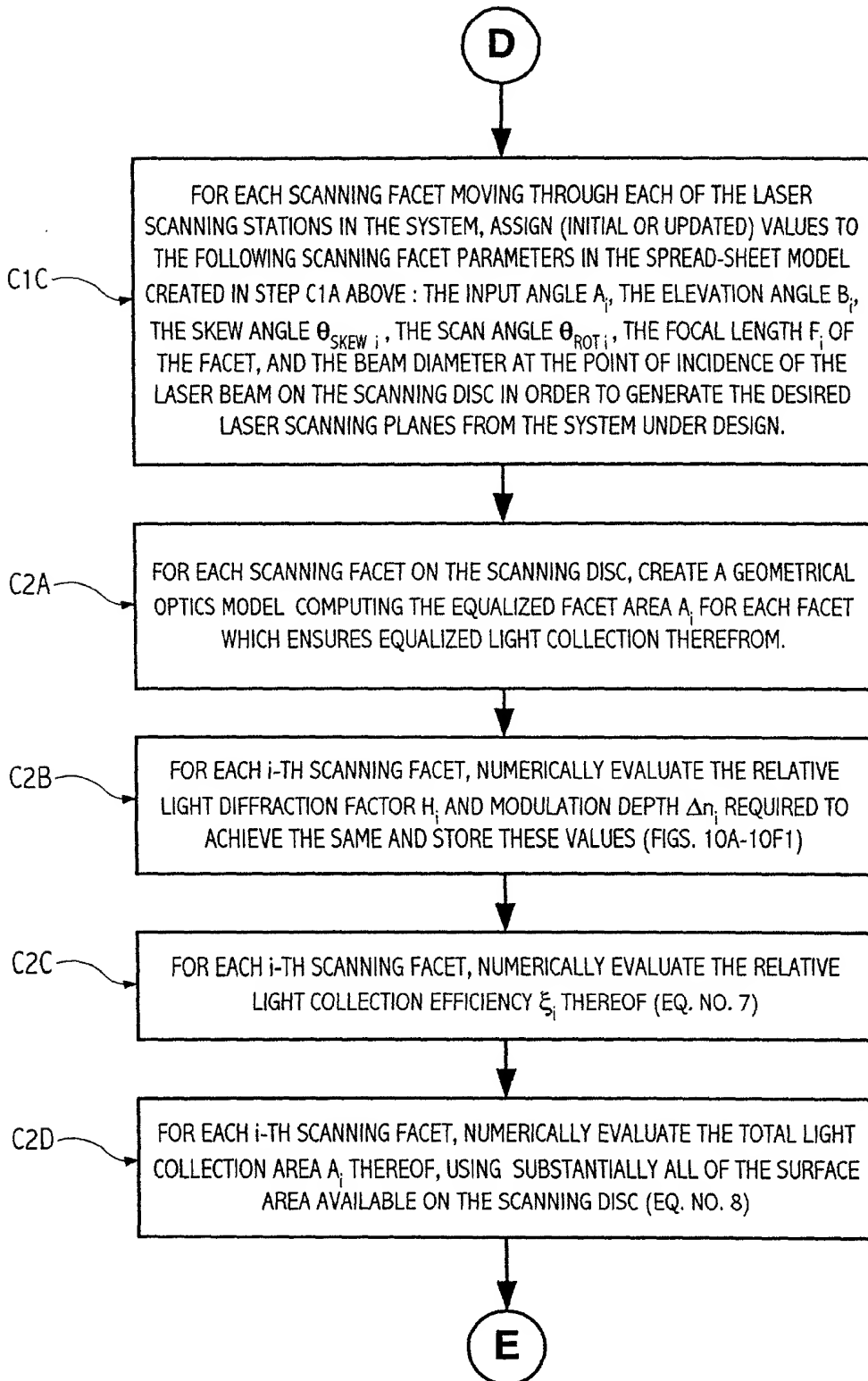


FIG. 7E

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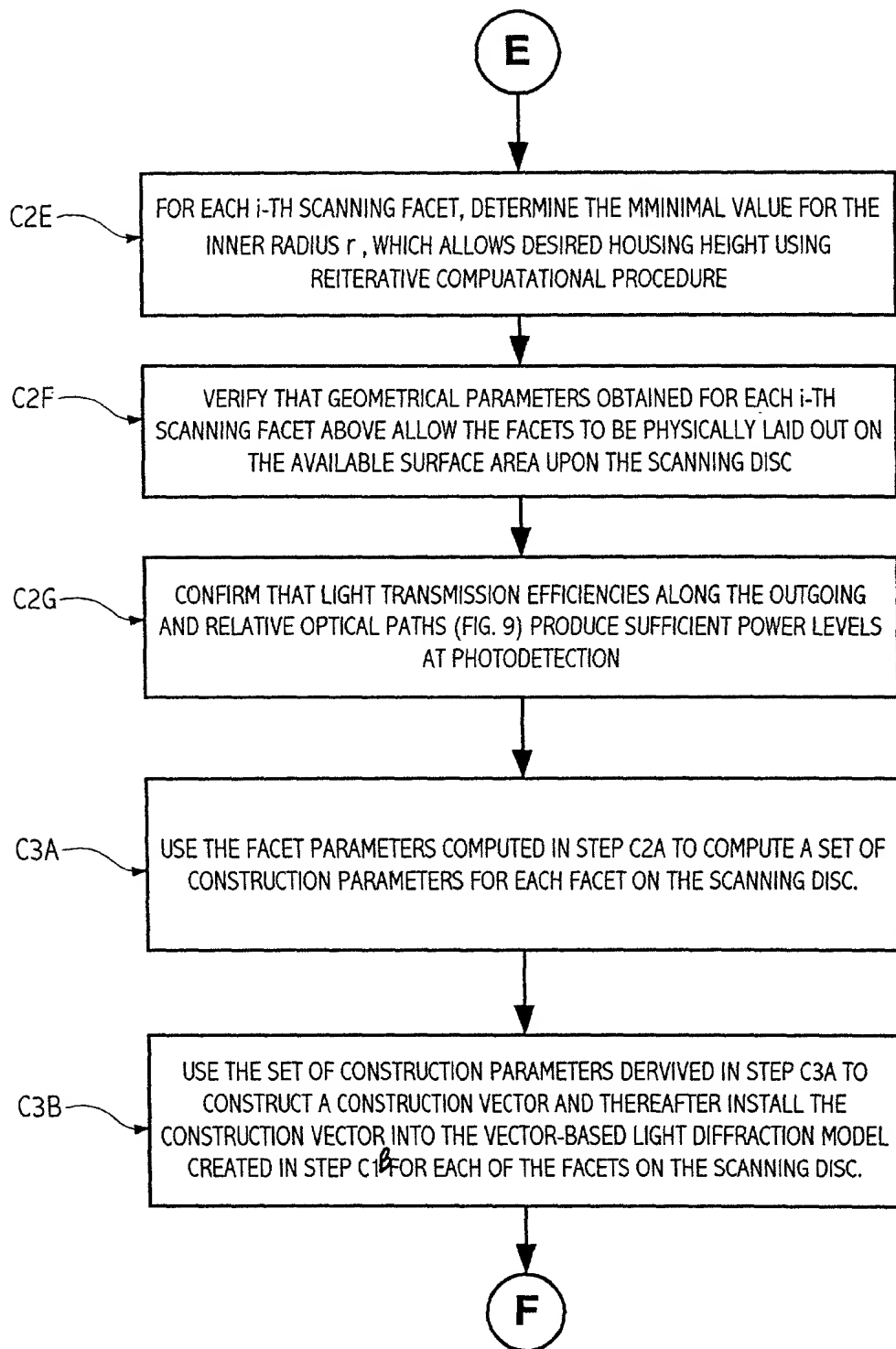


FIG. 7F

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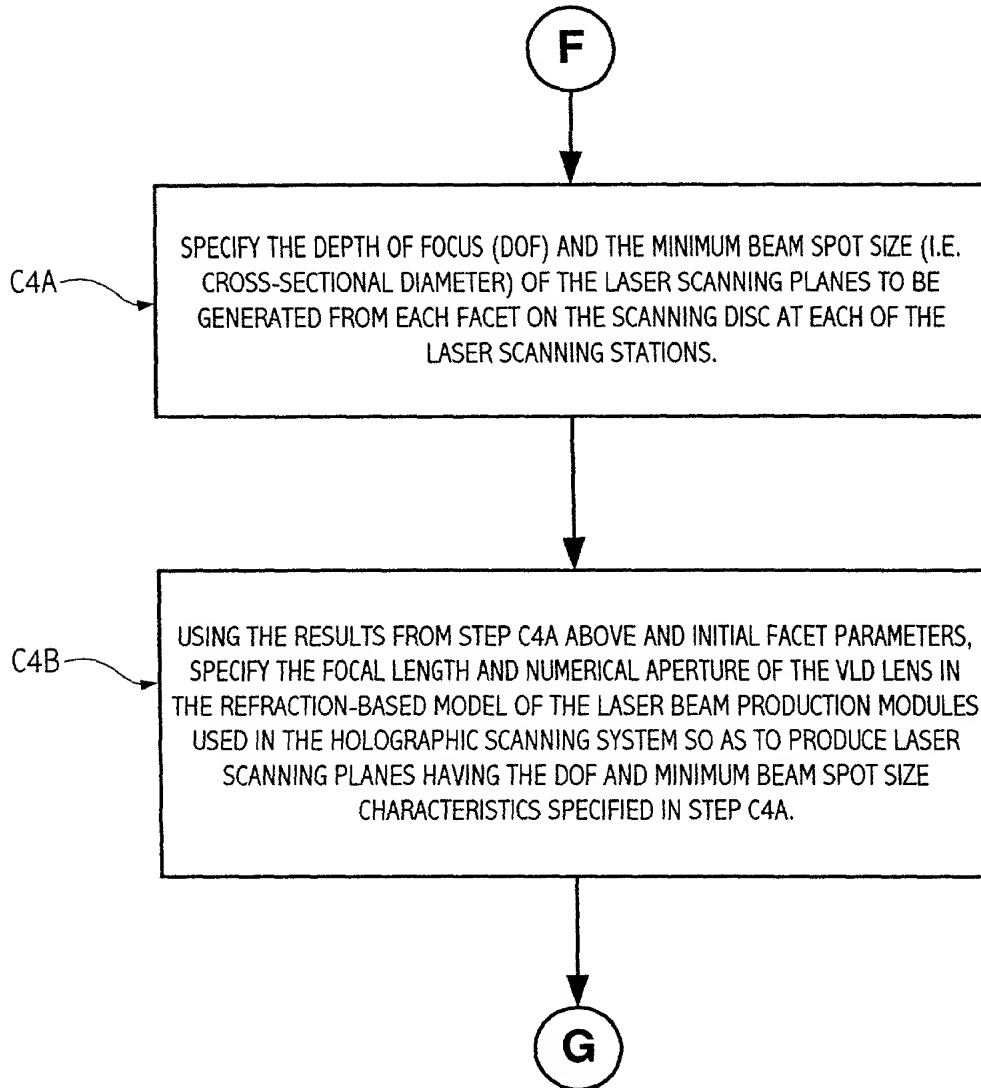


FIG. 7G

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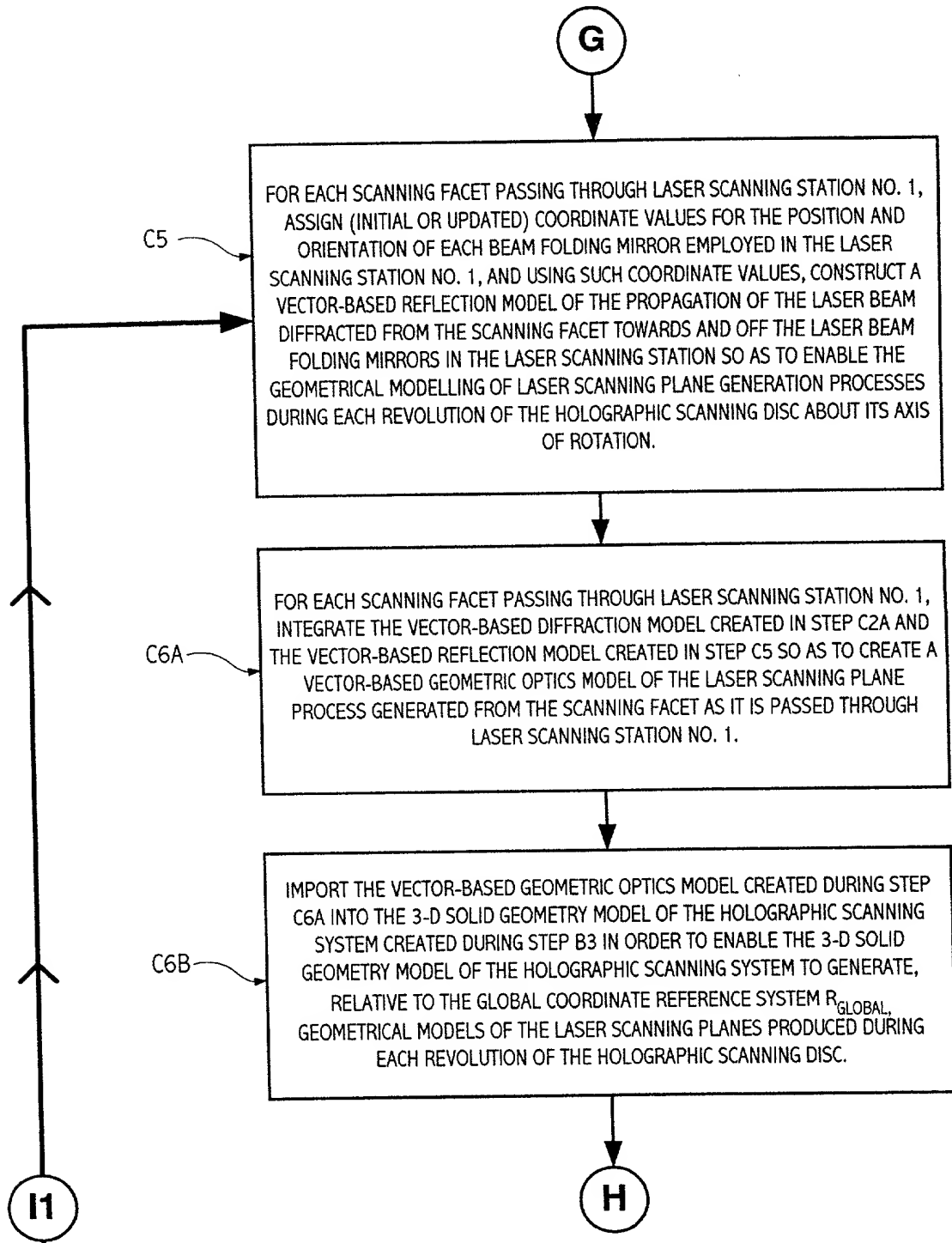


FIG. 7H

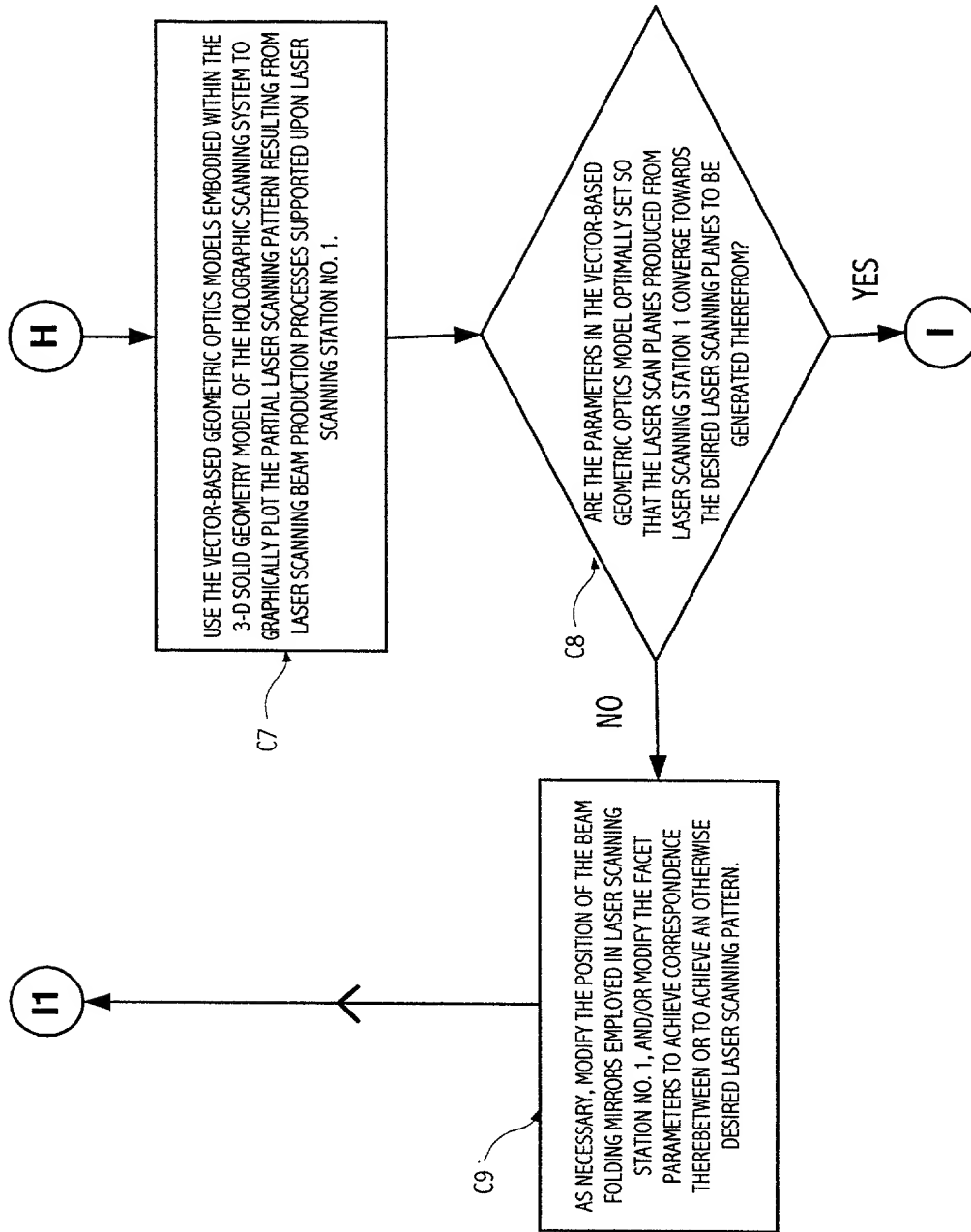


FIG. 71

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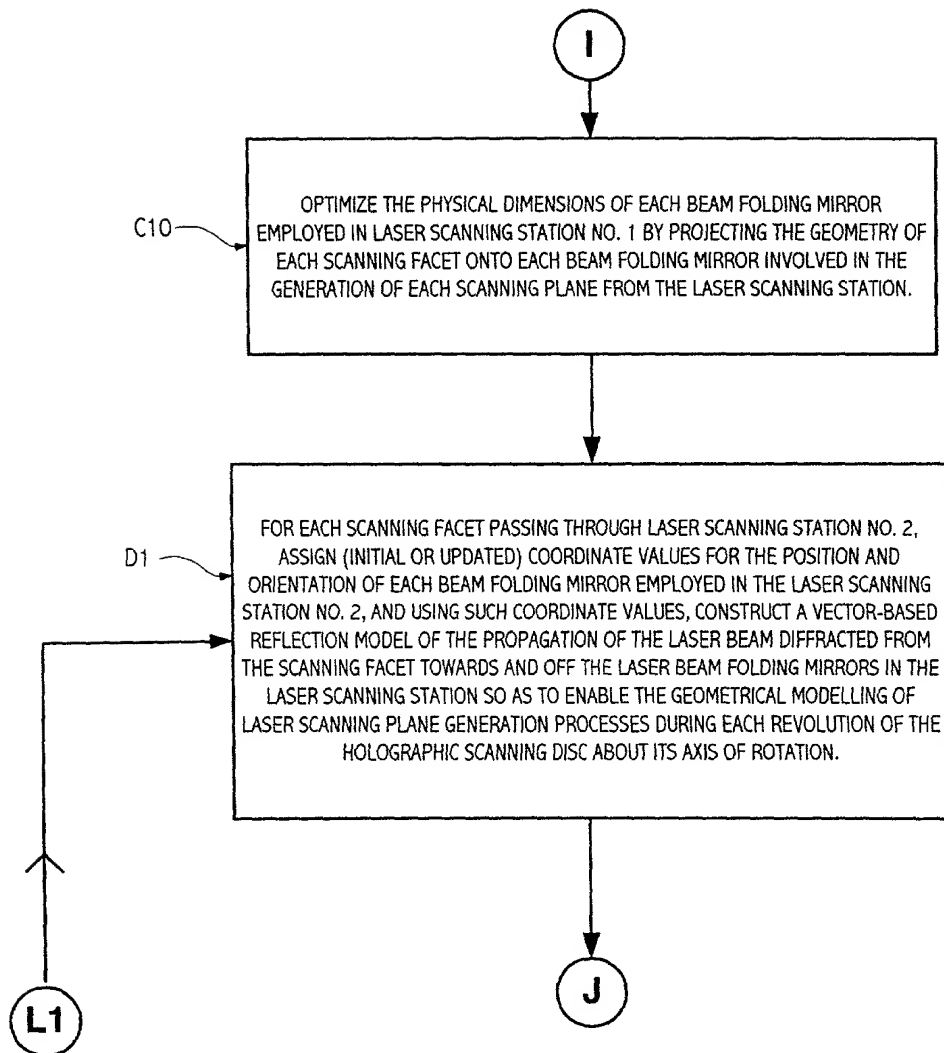


FIG. 7J

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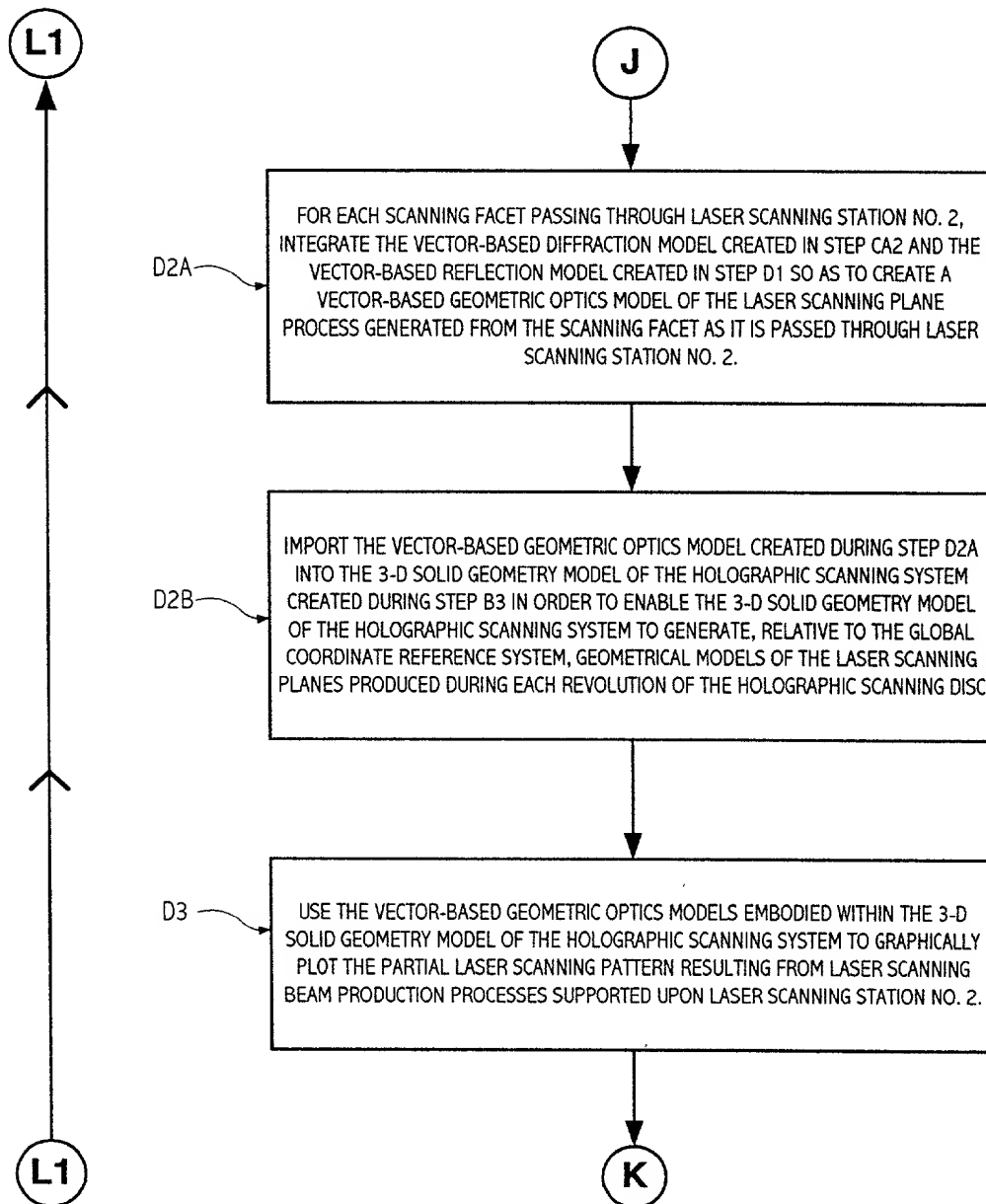


FIG. 7K

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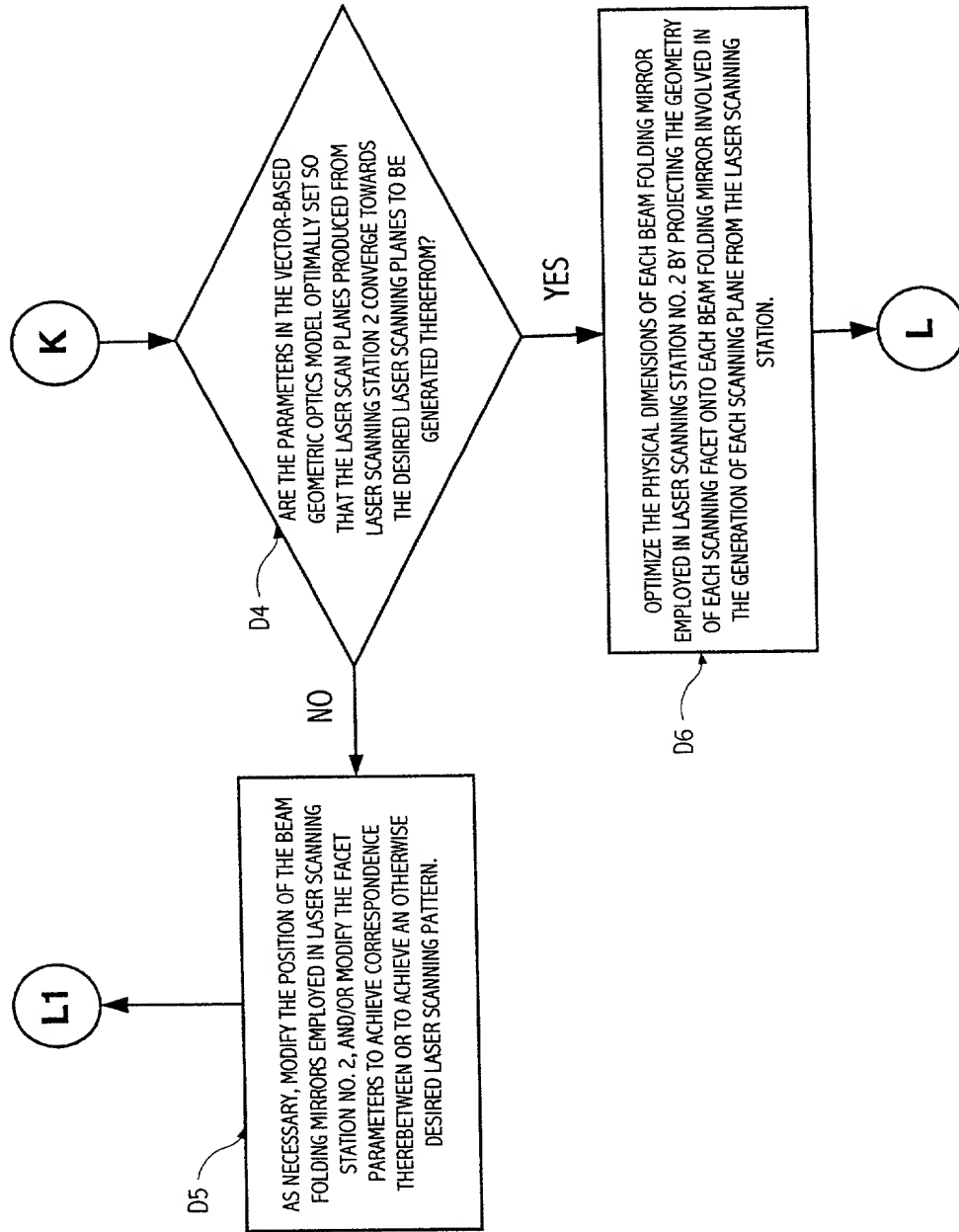


FIG. 7L

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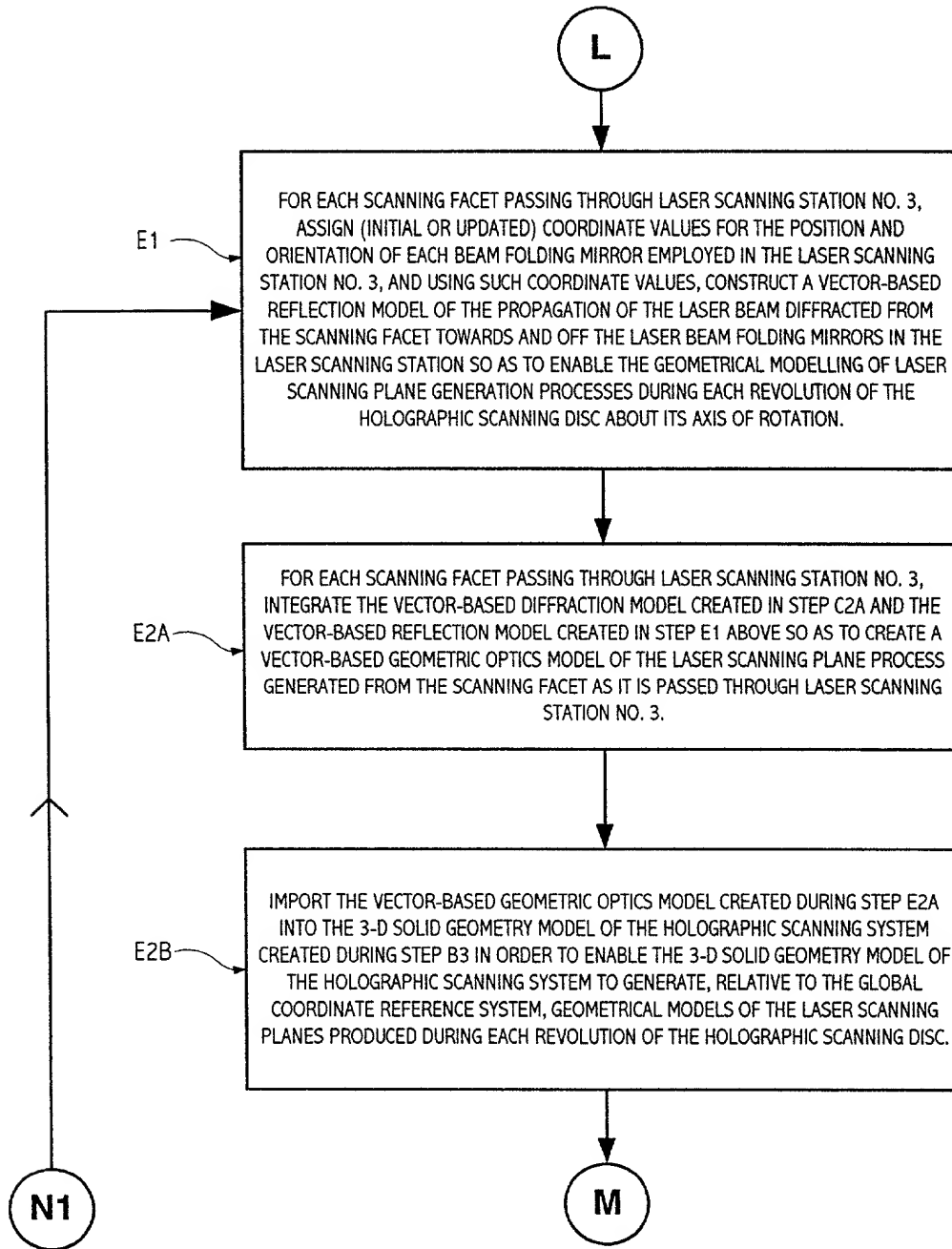


FIG. 7M

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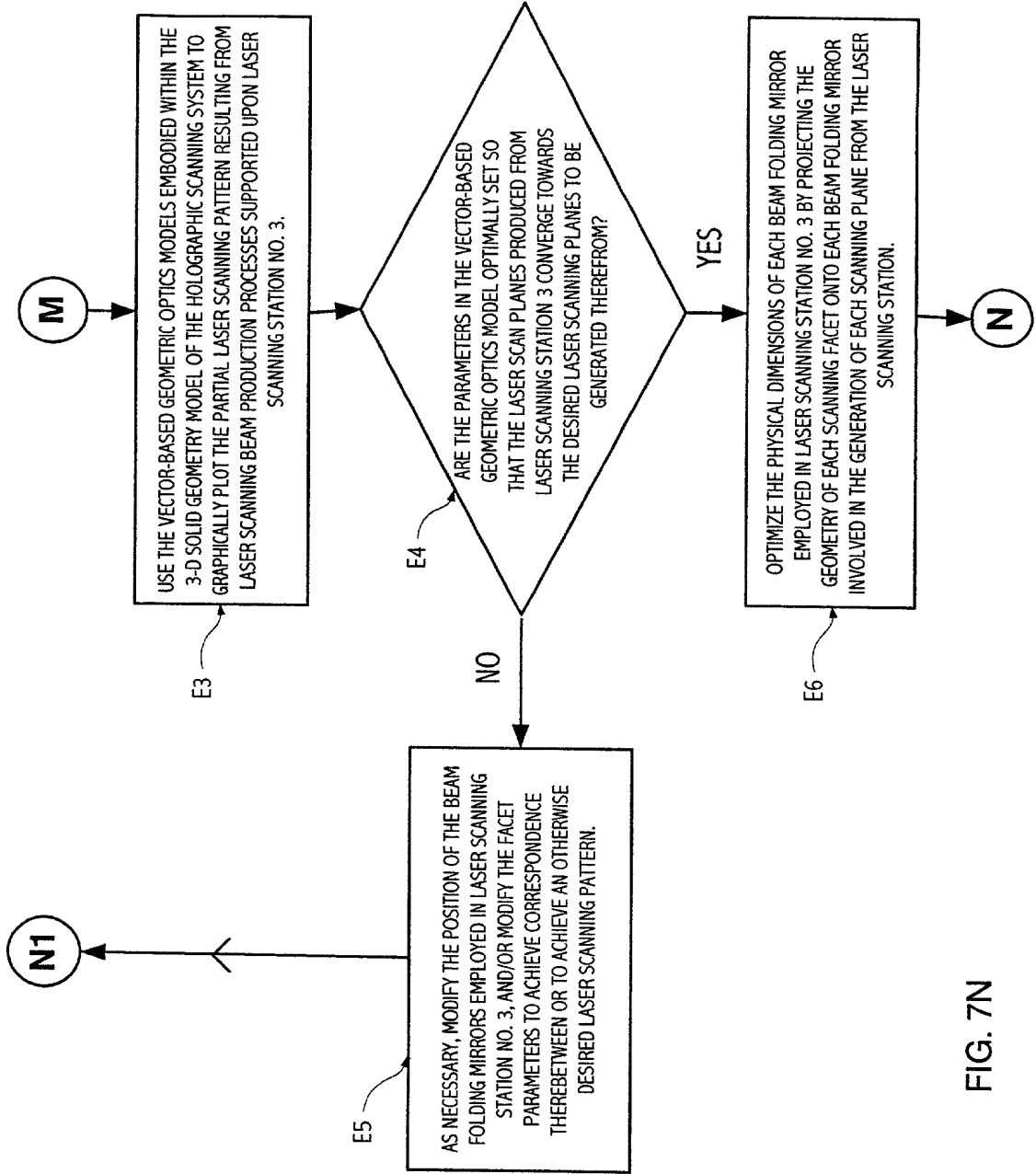


FIG. 7N

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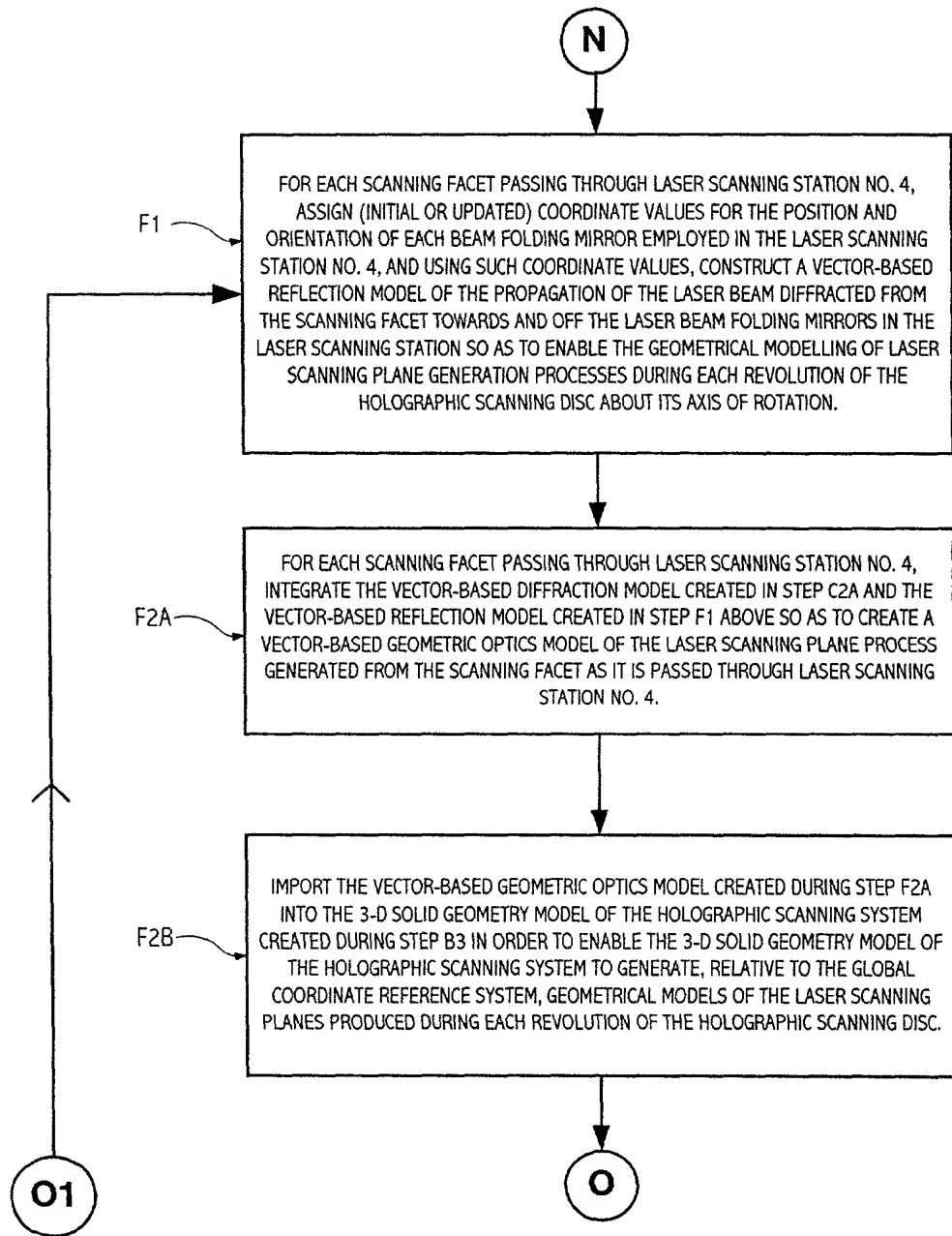


FIG. 70

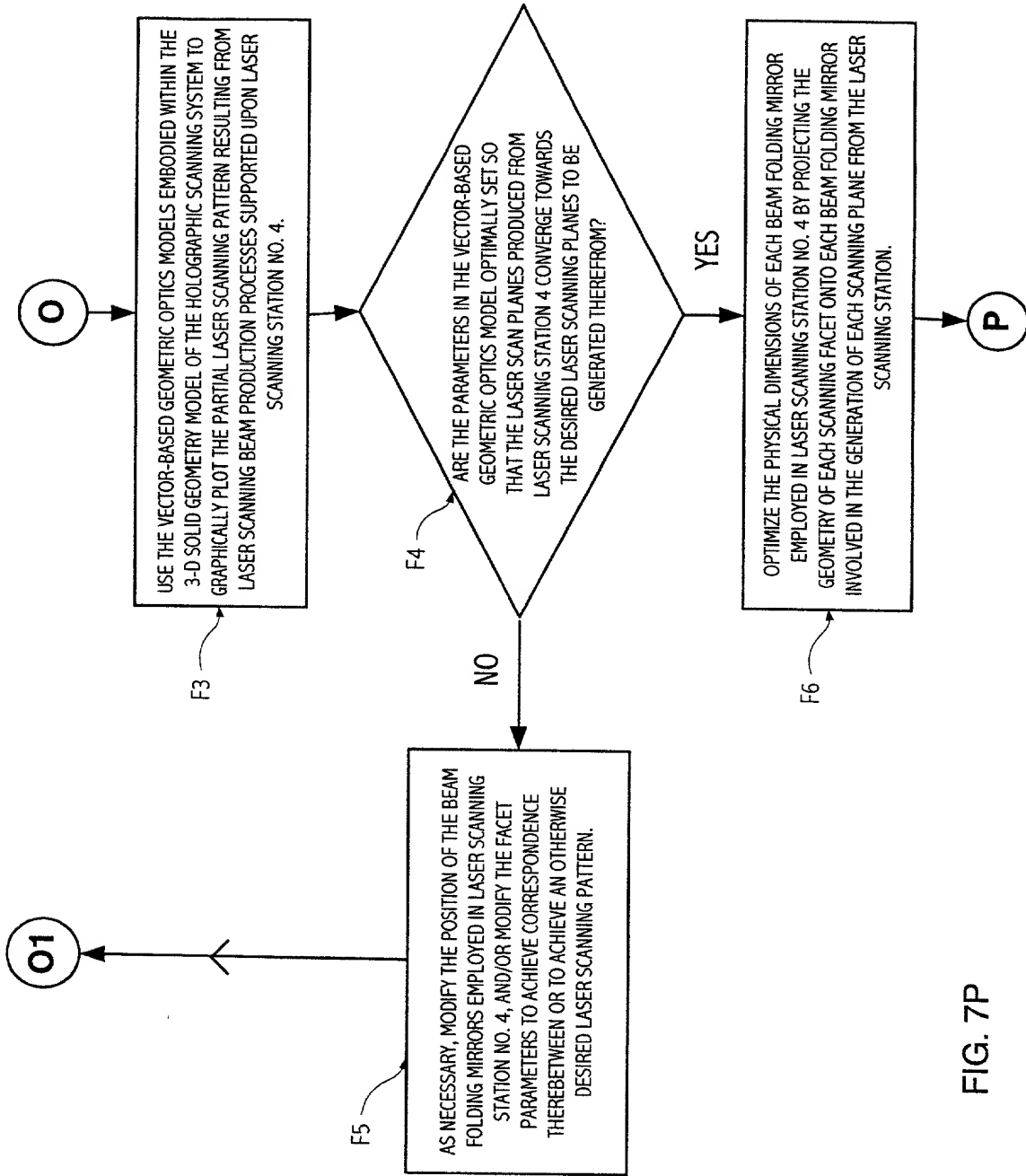


FIG. 7P

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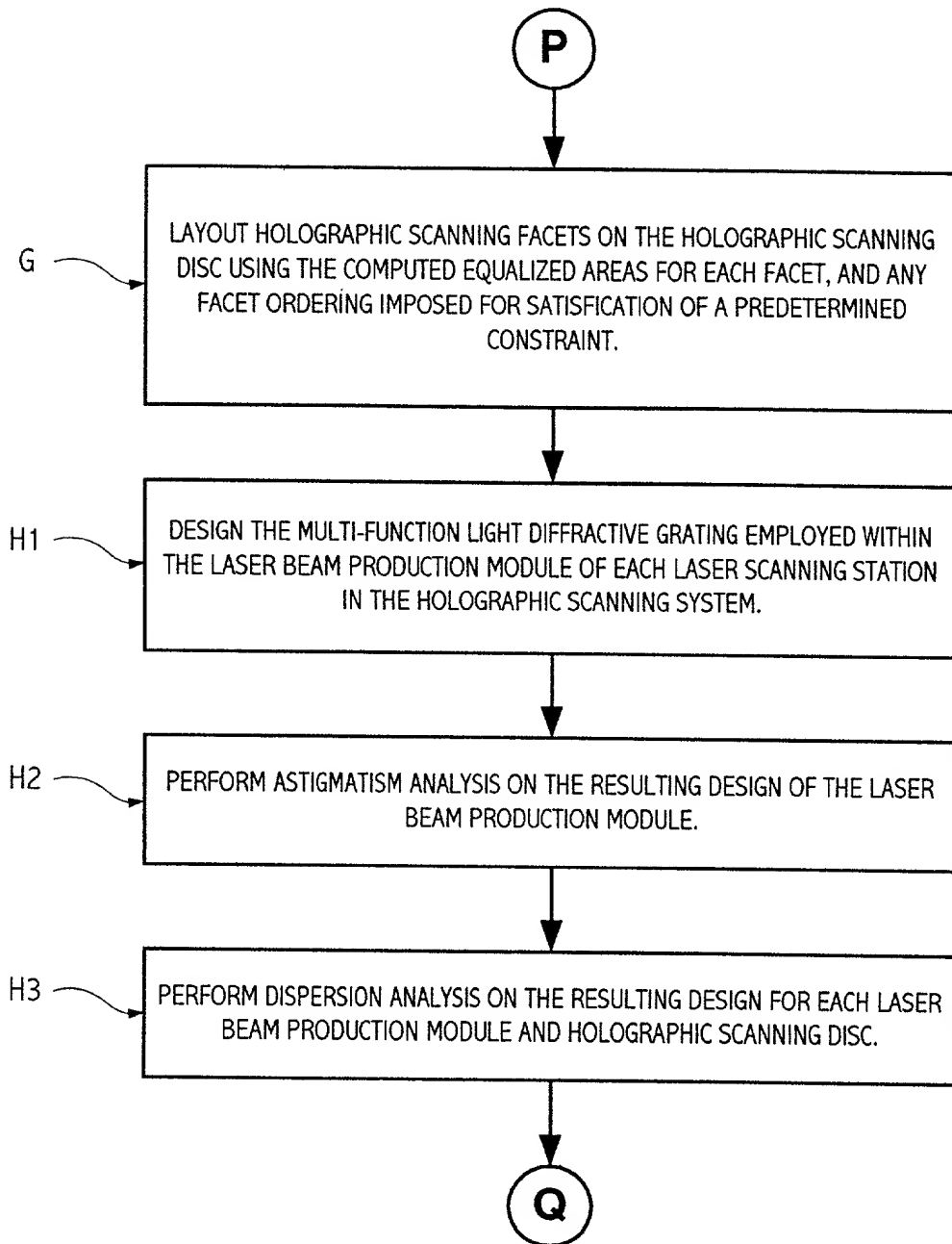


FIG. 7Q

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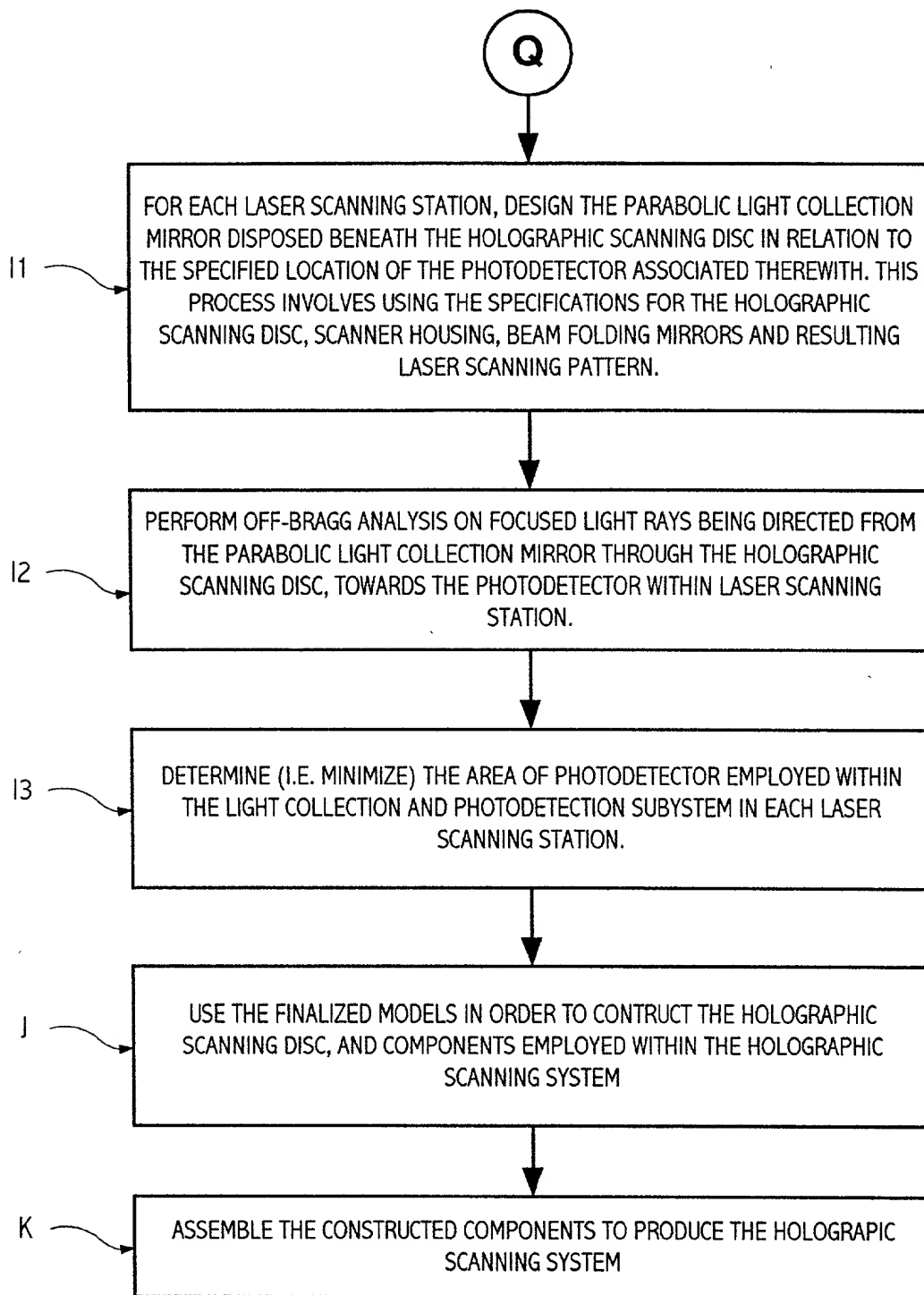


FIG. 7R

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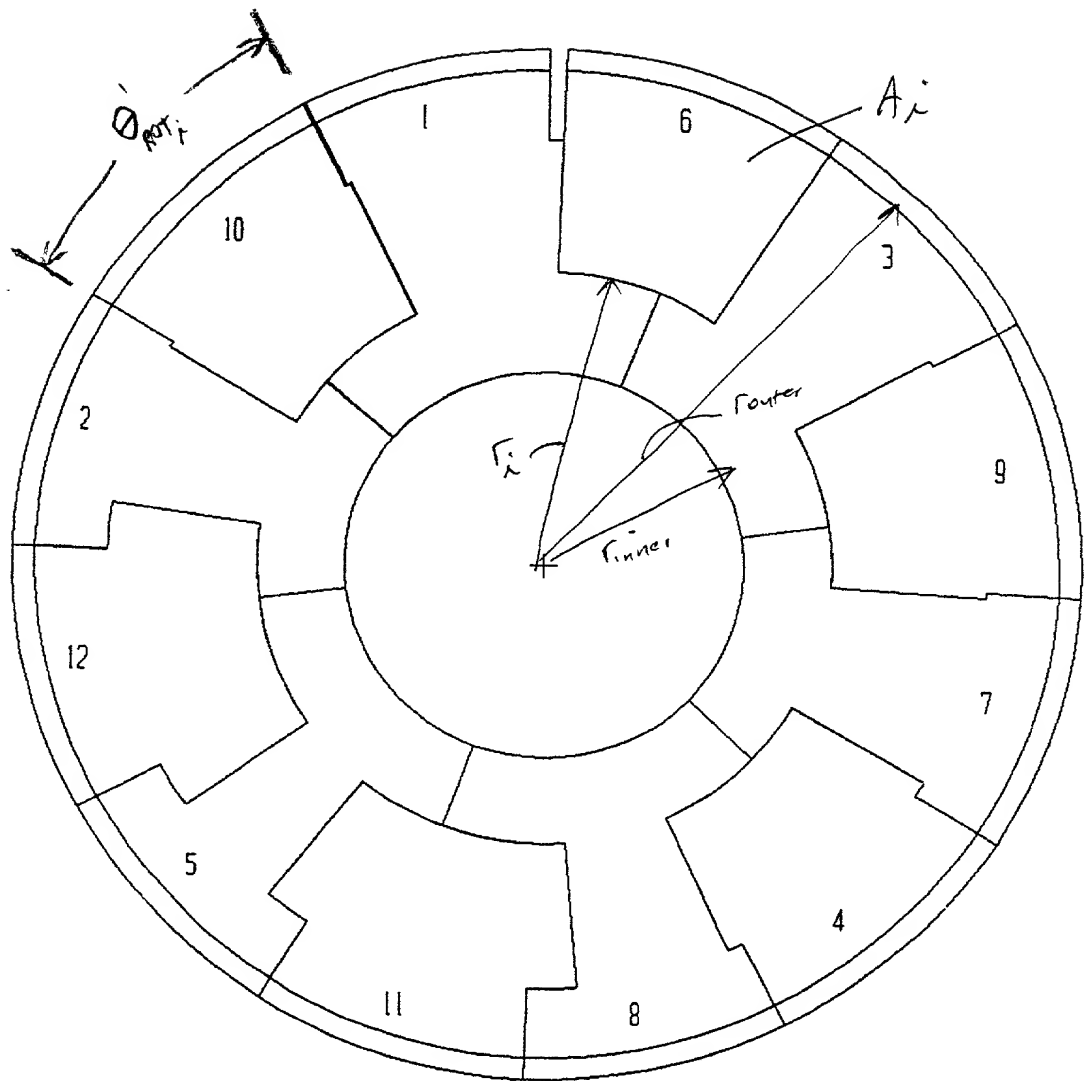


FIG. 8A

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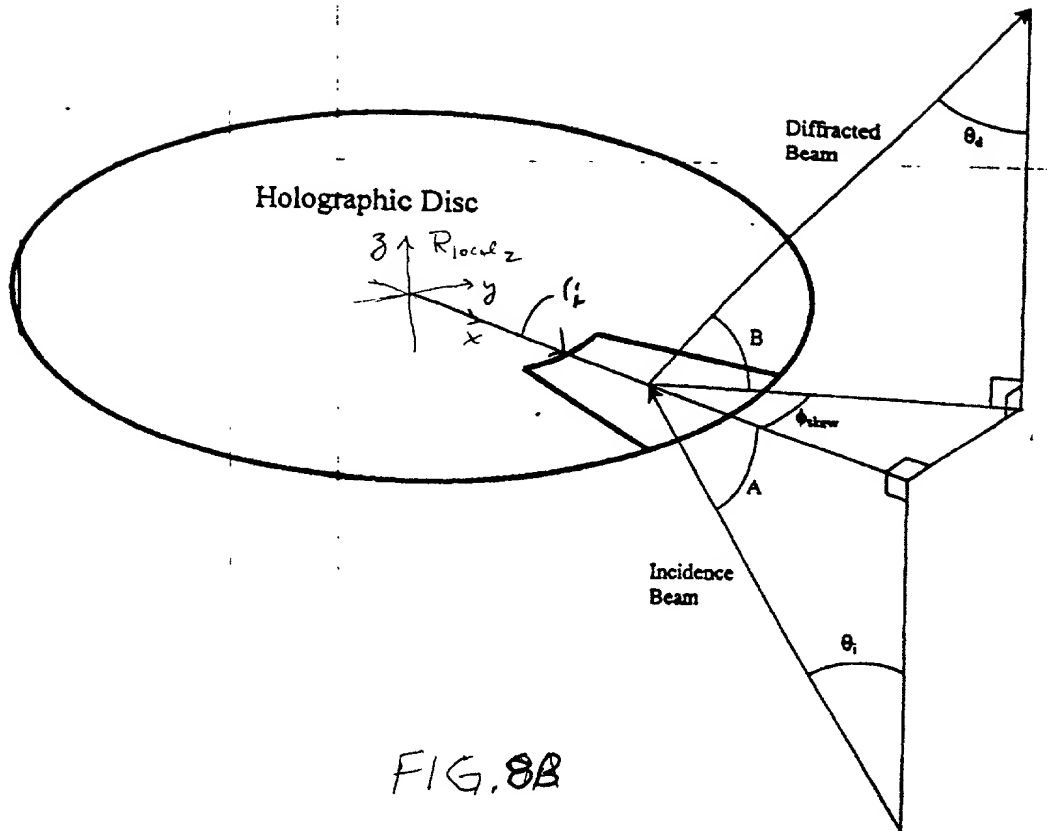


FIG. 8B

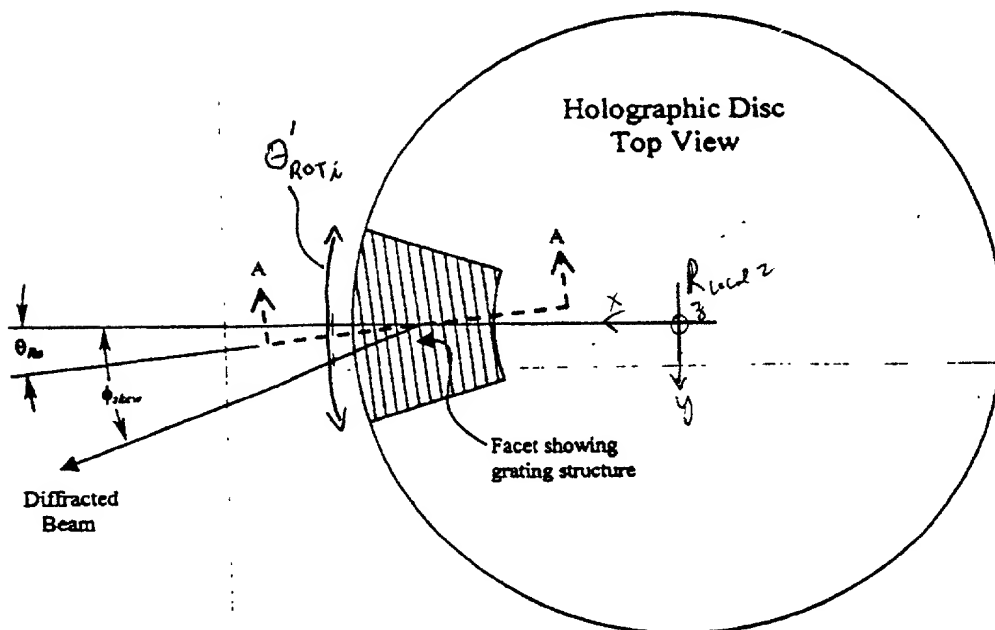


FIG. 8C

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- (1) THE RADIUS TO BEAM-INCIDENT-POINT ON THE HOLOGRAPHIC SCANNING DISC, ASSIGNED THE SYMBOLIC NOTATION " r_0 "
- (2) THE DISTANCE FROM RADIUS TO BEAM-INCIDENT-POINT r_0 TO BEAM FOLDING MIRROR , ASSIGNED THE SYMBOLIC NOTATION " L "
- (3) THE FACET NO. ON THE HOLOGRAPHIC SCANNING DISC, ASSIGNED THE SYMBOLIC NOTATION " i "
- (4) THE DISTANCE FROM THE BEAM INCIDENT POINT ON THE VIRTUAL SCANNING DISC TO THE FOCAL PLANE WITHIN WHICH THE (i, j) -TH SCANLINE RESIDES, ASSIGNED THE SYMBOLIC NOTATION " f_i "
- (5) THE DIAMETER OF THE CROSS-SECTION OF THE LASER BEAM SCANNING STATION, ASSIGNED THE SYMBOLIC NOTATION " d_{BEAM} "
- (6) THE ANGULAR GAP BETWEEN ADJACENT HOLOGRAPHIC SCANNING FACETS, ASSIGNED THE SYMBOLIC NOTATION " d_{GAP} "
- (7) THE OUTER RADIUS OF THE AVAILABLE LIGHT COLLECTION REGION ON THE HOLOGRAPHIC SCANNING DISC, ASSIGNED THE SYMBOLIC NOTATION " r_{OUTER} "
- (8) THE INNER RADIUS OF THE AVAILABLE LIGHT COLLECTION REGION ON THE HOLOGRAPHIC SCANNING FACET, ASSIGNED THE SYMBOLIC NOTATION " r_{INNER} "
- (9) THE FOCAL LENGTH OF THE i -TH HOLOGRAPHIC SCANNING FACET FROM THE SCANNING FACET TO THE CORRESPONDING FOCAL PLANE WITHIN THE SCANNING VOLUME, ASSIGNED THE SYMBOLIC NOTATION " f_i "
- (10) INCIDENT BEAM ANGLE, ASSIGNED THE SYMBOLIC NOTATION " A_i "

FIG. 8D1

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- (11) DIFFRACTED BEAM ANGLE, ASSIGNED THE SYMBOLIC NOTATION " B_i "
- (12) THE SCAN ANGLE OF THE LASER BEAM , ASSIGNED THE SYMBOLIC NOTATION " θ_{si} "
- (13) THE SCAN MULTIPLICATION FACTOR FOR THE i-TH HOLOGRAPHIC FACET, ASSIGNED THE SYMBOLIC NOTATION " M_i "
- (14) THE FACET ROTATION ANGLE FOR THE i-TH HOLOGRAPHIC FACET, ASSIGNED THE SYMBOLIC NOTATION " θ_{roTi} "
- (15) ADJUSTED FACET ROTATION ANGLE ACCOUNTING FOR DEADTIME, ASSIGNED THE SYMBOLIC NOTATION " θ'_{roTi} "
- (16) THE LIGHT COLLECTION EFFICIENCY FACTOR FOR THE i-TH HOLOGRAPHIC FACET, NORMALIZED RELATIVE TO THE 16TH FACET, ASSIGNED THE SYMBOLIC NOTATION " ξ_i "
- (17) THE MAXIMUM LIGHT COLLECTION AREA FOR THE i-TH HOLOGRAPHIC FACET, ASSIGNED THE SYMBOLIC NOTATION " $Area_i$ "
- (18) THE ANGLE OF SKEW OF THE DIFFRACTED LASER BEAM AT THE CENTER OF THE i-TH HOLOGRAPHIC FACET, ASSIGNED THE SYMBOLIC NOTATION " ϕ_{SKEW} "

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PARAMETER EQUATION USED IN THE SPREADSHEET DESIGN OF THE SCANNER

(1) f_i Focal Length - f_{i-th} facet

(2) B_i Elevation Angle; $\theta_{dif i} = 90 - B_i$

(3) θ_{Si}

(4) $M_i := \frac{r_0}{f_i} \cos(\theta_{skew}) + \cos(\lambda_i) + \cos(B_i)$

(5) $\theta_{roti} := \frac{\theta_{Si}}{M_i}$

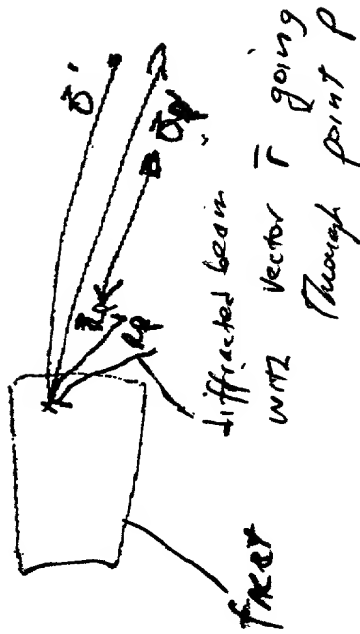
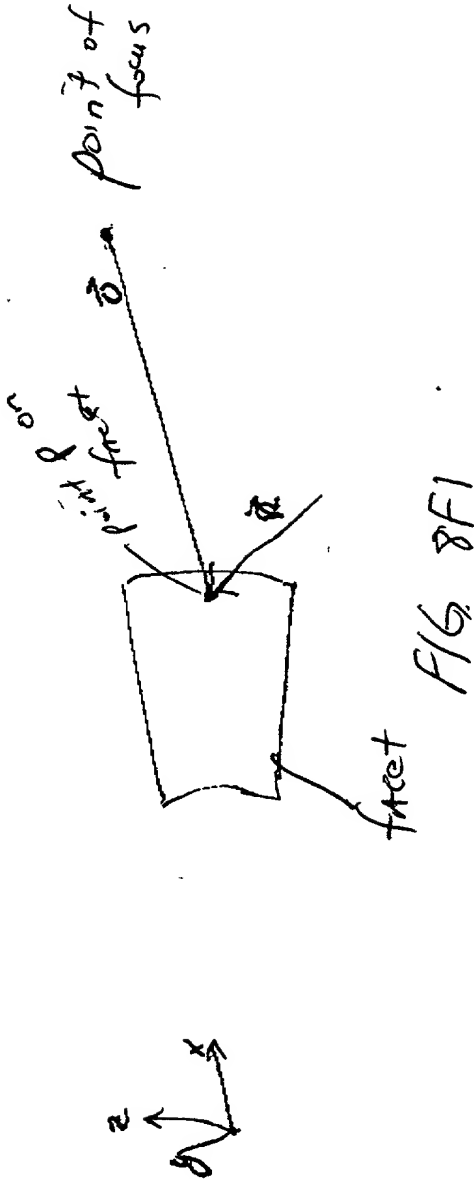
(6) $\theta'_{roti} := \theta_{roti} + \underbrace{\frac{d_{beam}}{r_0} + \frac{d_{gap}}{r_0}}_{\Theta_{dead}}$

(7) $\xi_i := \left[\frac{f_i}{f_{20}} \right]^2 \frac{\sin[B_{20}]}{\sin(B_i)} H_i$

(8) $Area_i := \pi \left[r_{outer}^2 + r_{inner}^2 \right] \frac{\xi_i}{\sum_{i=1}^{20} [\xi_i]} \quad i = 1, 2, \dots, 20$

FIG. 8E

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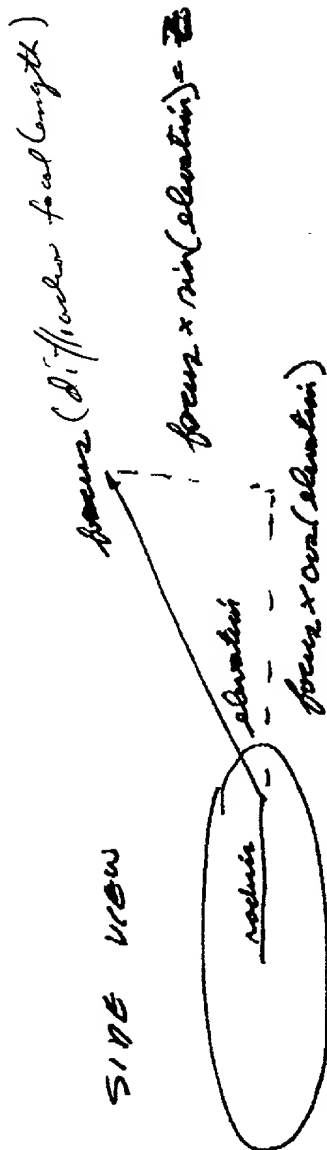
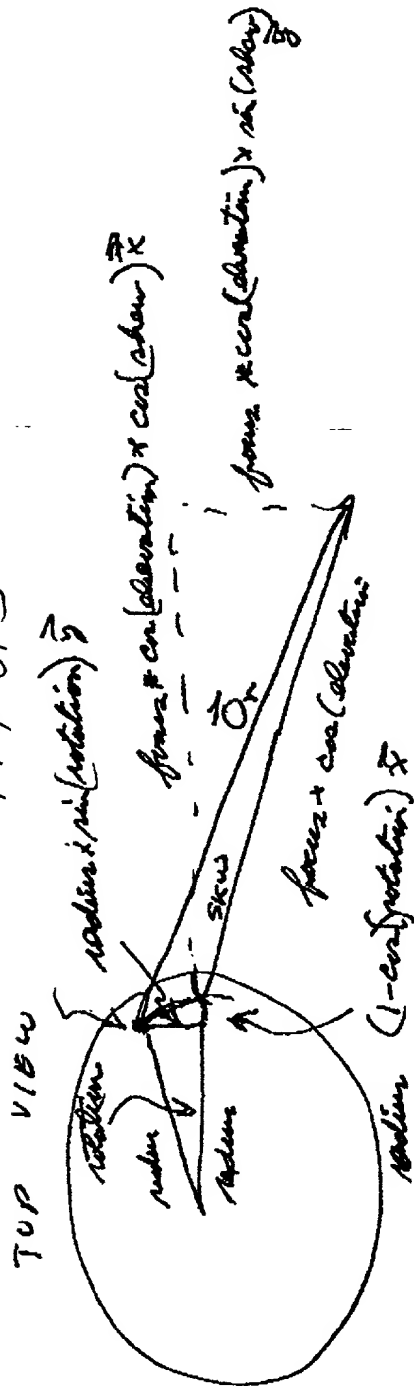


FIG. 8F3



(Or is equal to the sum of these components)

FIG. 8F4

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Object ray \vec{O}_p composition:

$$\begin{aligned} \vec{O}_p = & \text{focus} \times \cos(\text{elevation}) \times \cos(\text{skew}) + \text{radius} (1 - \cos(\text{rotation})) \hat{y} \\ & + \text{focus} \times \cos(\text{elevation}) \times \sin(\text{skew}) + \text{radius} \sin(\text{rotation}) \hat{y} \\ & + \text{focus} \times \sin(\text{elevation}) \cdot \hat{z} \end{aligned}$$

where

- focus = The diffraction
- elevation = elevation angle of face
- skew = skew angle of face
- radius = radius to point P
- rotation = START-MIDDLE-END of scan angles

FIG. 8 F3

UNCLASSIFIED
 EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION
 EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION

*** Optical Power at the Data Detector and Resulting Signal Levels ***											
Calculation of the power at the data detector for targets located at the focal plane and targets located at the maximum depth of field limits for each look. Assumes average angular offset of: 0.7 degrees											
(Check of output beam from center of beam)											
Look	Power (mW)	Trans. of collimating lens	Ref. of mirror	Diff. Eff. of MF plate	S. diff. eff. of holographic facet	S. refl. of second, third & fourth mirror	Trans. of Window	(At focal plane) Lambertian reflectance factor	(At maximum depth of field) Lambertian reflectance factor	Average of P and S. refl. of second, third & fourth mirror facet	Average of P and S. diff. eff. of holographic mirror
1	3.36	0.48		0.95	0.95	0.97	0.97	0.9	0.9	0.9	0.9
2					0.99	0.99	0.99	0.007778	0.0018058	0.99	0.99
3					0.99	0.99	0.99	0.007778	0.0017176	0.99	0.99
4					0.99	0.99	0.99	0.008441	0.0017579	0.99	0.99
5					0.99	0.99	0.99	0.008441	0.0016637	0.99	0.99
6					0.99	0.99	0.99	0.008441	0.0016604	0.99	0.99
7					0.99	0.99	0.99	0.008441	0.0016602	0.99	0.99
8					0.99	0.99	0.99	0.008441	0.0016650	0.99	0.99
9					0.99	0.99	0.99	0.008441	0.0016650	0.99	0.99
10					0.99	0.99	0.99	0.008441	0.0015995	0.99	0.99
11					0.99	0.99	0.99	0.008441	0.0015995	0.99	0.99
12					0.99	0.99	0.99	0.008441	0.0015995	0.99	0.99

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FIG. 9

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GEOMETRICAL OPTICS MODEL FOR HOLOGRAPHIC (TOTAL OUT AND BACK) LIGHT DIFFRACTION EFFICIENCY CALCULATIONS

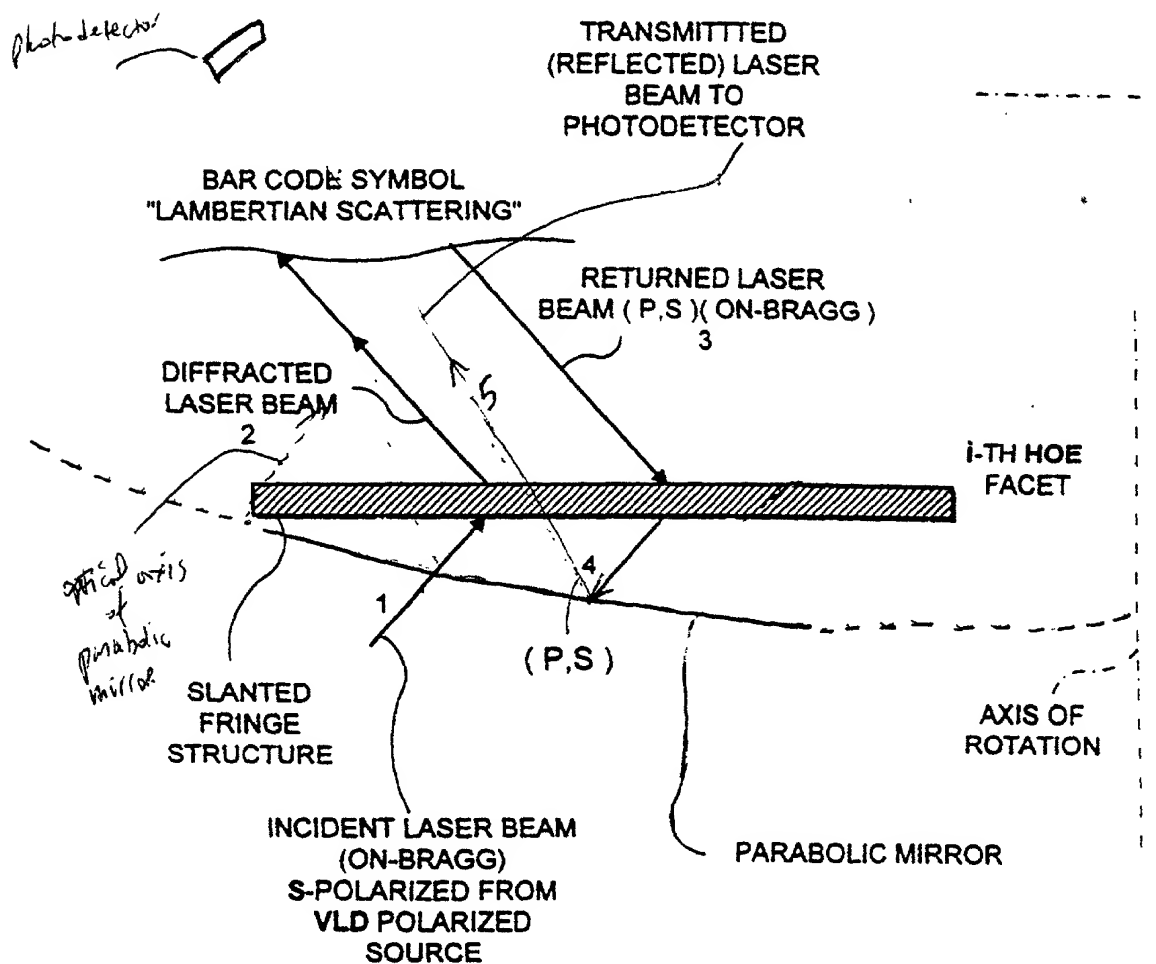


FIG. 10A1

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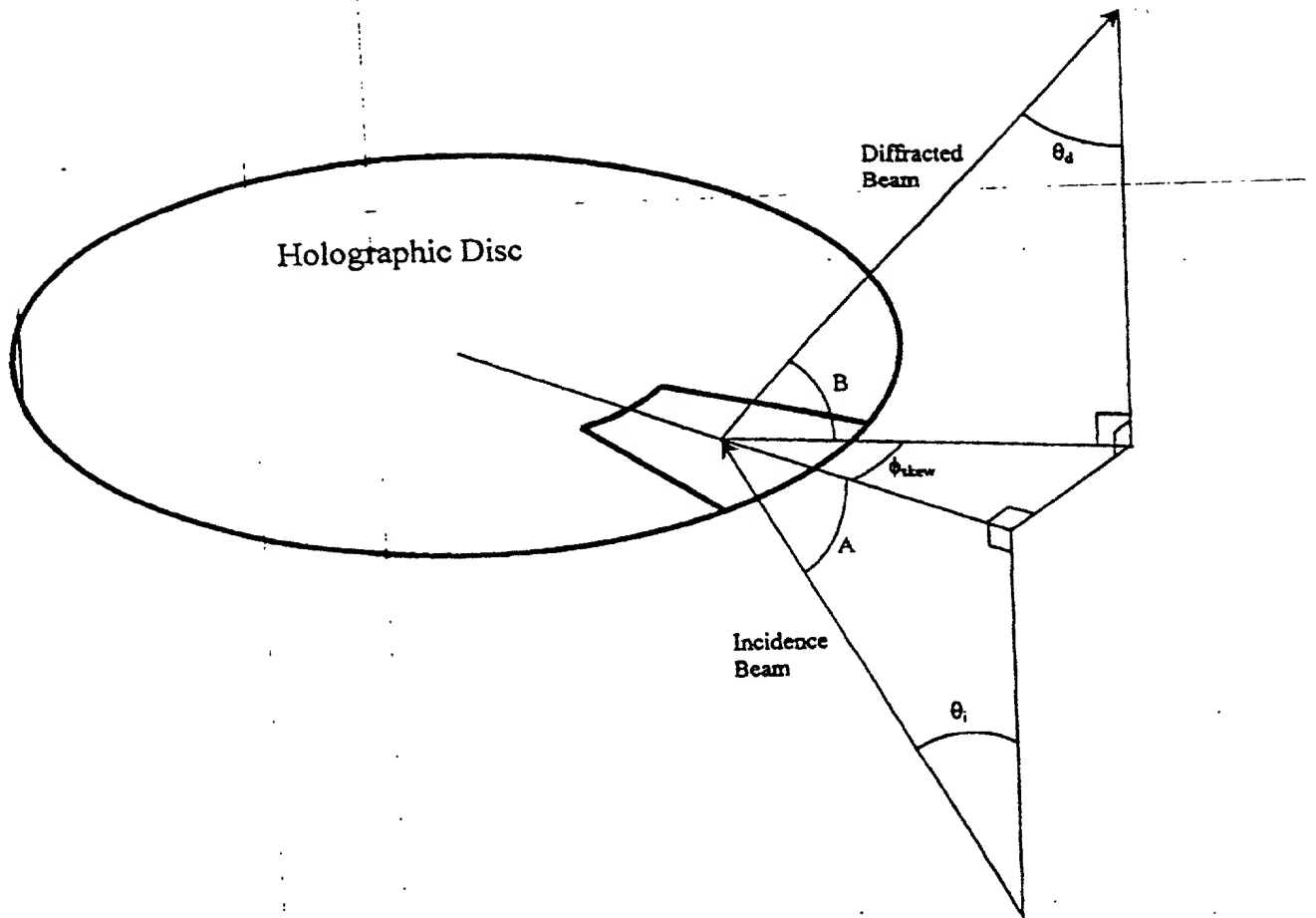


FIG. 10A2

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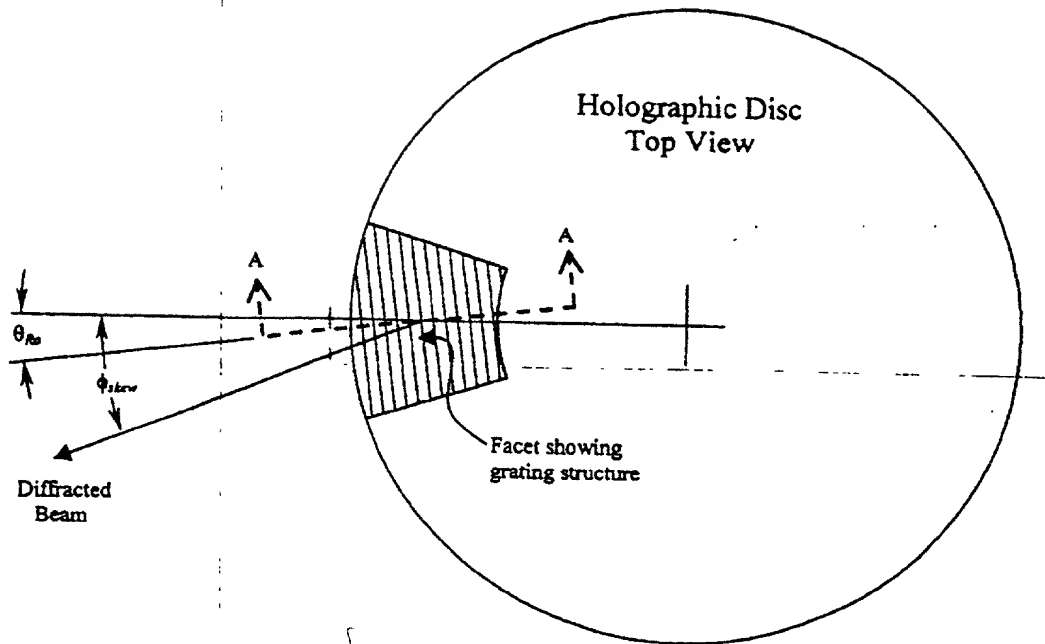


FIG. 10A3

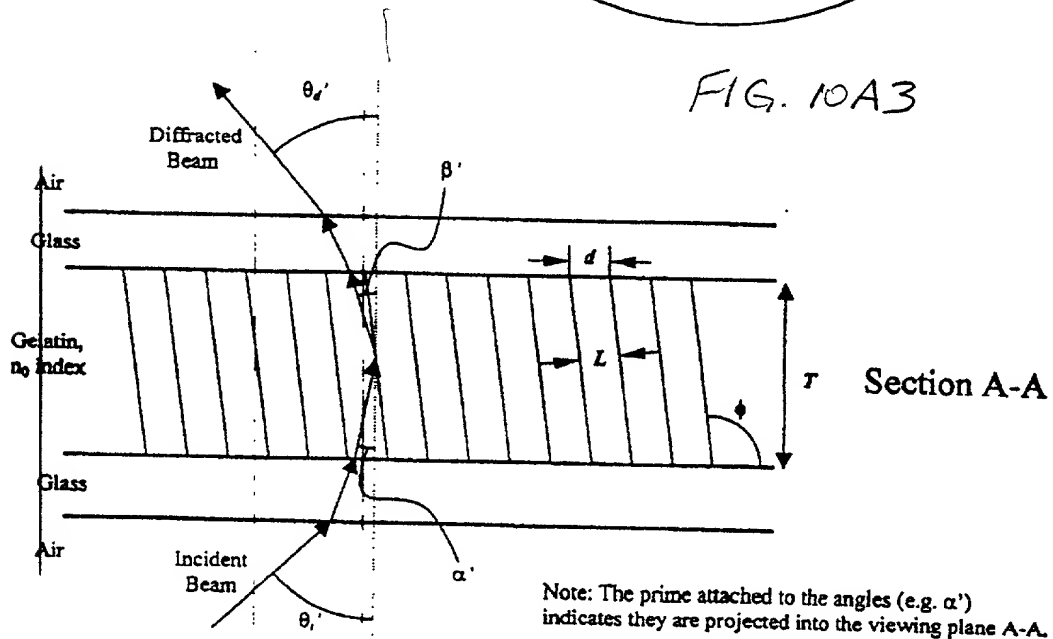


FIG. 10A4

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S AND P DIFFRACTION EFFICIENCY ANALYSIS FOR THE MOST GENERAL CASE

The following analysis takes into consideration slanted fringes, skewed design, off-Bragg effects, and disc rotation effects. It is assumed that the wavelength does not deviate from the design, and that all scattering, absorption, and reflection losses are taken into account by the transmission coefficients, t_s and t_p , which are determined by measurement.

Definitions:

- θ_i = Angle of incidence outside the HOE ($\theta_i = 90^\circ - A$);
- α = Angle of incidence inside the HOE;
- θ_d = Angle of diffraction outside the HOE ($\theta_d = 90^\circ - B$);
- β = Angle of diffraction inside the HOE;
- ϕ_{skew} = Skew angle of the HOE;
- ϕ = Tilt of Bragg planes ($\phi = \pi/2$ for no tilt);
- θ_R = Rotation angle of HOE grating ($\theta_R = \theta_{Ro}$ when facet is centered);
- L = Separation of the Bragg planes;
- T = Thickness of the HOE medium;
- d = HOE surface fringe spacing;
- n_0 = Average refractive index of HOE medium;
- n_1 = modulation (i.e. amplitude of periodic variation) of refractive index;
- λ_a = Laser wavelength in air;
- t_s = Transmission of S-polarization through disc considering losses;
- t_p = Transmission of P-polarization through disc considering losses.

FIG. 10B

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$$(1) \quad \alpha = \arcsin\left(\frac{\sin \theta_i}{n_0}\right)$$

$$(2) \quad \beta = \arcsin\left(\frac{\sin \theta_d}{n_0}\right)$$

$$(3) \quad \phi = \arcsin\left(\frac{\cos \beta - \cos \alpha}{\sqrt{2(1 + \sin \alpha \sin \beta \cos \phi_{skew} - \cos \alpha \cos \beta)}}\right) + 90$$

$$(4) \quad d = \sqrt{\frac{\lambda_a^2}{\sin^2 \theta_d \sin^2 \phi_{skew} + (\sin \theta_i + \sin \theta_d \cos \phi_{skew})^2}}$$

$$(5) \quad L = d \sin \phi$$

$$(6) \quad C_R = \cos \alpha$$

$$(7) \quad C_S = \cos \alpha - \frac{\lambda_d}{n_0 L} \cos \phi$$

$$(8) \quad N = \pi n_1 \frac{T}{\lambda_a \sqrt{C_R C_S}}$$

$$* (9) \quad \theta_{Ro} = \arcsin\left(\frac{d}{\lambda_a} \sin \theta_d \sin \phi_{skew}\right)$$

$$(10) \quad \Gamma = \frac{2\pi(\sin \alpha \sin \phi \cos \theta_{Ro} + \cos \alpha \cos \phi)}{L} - \frac{\pi \lambda_a}{n_0 L^2}$$

$$(11) \quad S = \Gamma \frac{T}{2C_S}$$

Figure 10C1

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$$(12) \quad \kappa = -\sin \alpha \sin \beta \cos \phi_{skew} + \cos \alpha \cos \beta$$

$$(13) \quad E_{par} = \frac{\left(\sin \left(\sqrt{N^2 + S^2} \right) \right)^2}{1 + \frac{S^2}{N^2}}$$

$$(14) \quad E_{perp} = \frac{\left(\sin \left(\sqrt{(N\kappa)^2 + S^2} \right) \right)^2}{1 + \frac{S^2}{(N\kappa)^2}}$$

$$(15) \quad P_{par} = \frac{-\sin \phi \sin \theta_{Ro}}{\sin(\arccos(-\sin \alpha \sin \phi \cos \theta + \cos \alpha \cos \phi))}$$

$$(16) \quad P_{perp} = 1 - P_{par}$$

Diffraction efficiencies E_s and E_p , given losses t_s and t_p which are specific to each polarization and include absorption, scattering, and reflection losses from AR coatings on the outer surfaces of the disc glass.

$$(17) \quad E_s = (E_{perp}P_{par} + E_{par}P_{perp})t_s$$

$$(18) \quad E_p = (E_{perp}P_{perp} + E_{par}P_{par})t_p$$

Total out-and-back efficiency is given by T_s , assuming no polarizer in front of the photodetector

$$(19) \quad T_s = E_s \frac{E_s + E_p}{2}$$

Figure 10C2

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$$(20) \theta_d \{\theta_R\} = \arcsin \sqrt{\left(\frac{\lambda_a}{d}\right)^2 - 2 \frac{\lambda_a}{d} \cos \theta_R \sin \theta_i + \sin^2 \theta_i}$$

$$(21) \phi_{skew} \{\theta_R\} = \arctan \left[\frac{\sin \theta_R}{\cos \theta_R - (d/\lambda_a) \sin \theta_i} \right]$$

$$(22) T_s \{\theta_{i \max}\} \cos \theta_d|_{\theta_R = \theta_{Ro} - \frac{1}{2} \theta_{ROT}} = T_s \{\theta_{i \max}\} \cos \theta_d|_{\theta_R = \theta_{Ro} + \frac{1}{2} \theta_{ROT}}$$

The design efficiency of the i^{th} facet is given by evaluating T_s at the design incidence angle, θ_i , the design rotation angle, θ_{Ro} , and the index modulation that maximizes the efficiency, $n_{1 \max}$, given the true maximum efficiency incidence angle, $\theta_{i \max}$, that results from equation (22). The relative efficiency, H_i , is then given by dividing the total efficiency of the first facet by that of the i^{th} facet.

$$(23) H_i = \frac{T_{s1}}{T_{si} \{\theta_i, \theta_{i \max}, \theta_{Ro}, n_{1 \max}\}}$$

Figure 10C3

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Diffraction Efficiency Variation with Disc Rotation

Facet 1: before optimization

Fixed design parameters:

$$\theta_i = 38^\circ$$

$$\theta_d = 52^\circ$$

$$\phi_{skew} = 0^\circ$$

$$\lambda_d = 650 \text{ nm}$$

DCG parameters:

$$T = 2.5 \text{ microns}$$

$$n_0 = 1.40$$

$$n_1 = 0.121$$

Relative signal is equal to $T_s \cos \theta_d$. Note that the relative signal falls off as the rotation angle goes away from zero. This is for a maximum efficiency incidence angle, θ_{imax} , equal to θ_i (38°). This indicates a non-optimum configuration.

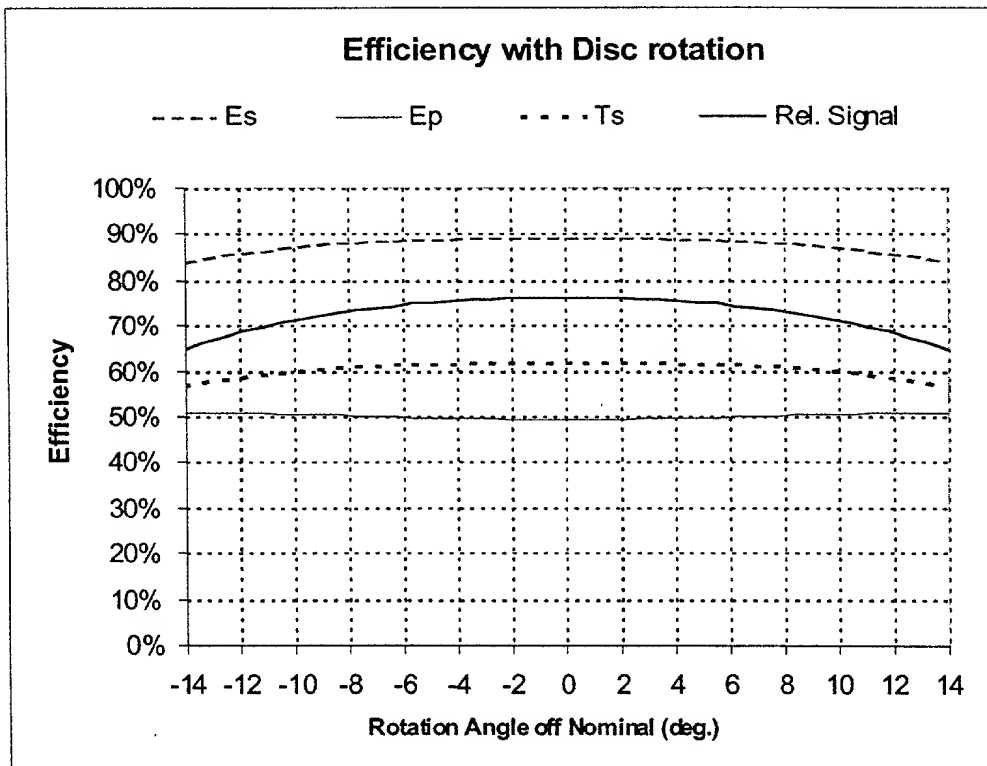


FIG. 10D1

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Diffraction Efficiency Variation with Disc Rotation

Facet 1: after optimization

Fixed design parameters:

$$\theta_i = 38^\circ$$

$$\theta_d = 52^\circ$$

$$\phi_{skew} = 0^\circ$$

$$\lambda_d = 650 \text{ nm}$$

DCG parameters:

$$T = 2.5 \text{ microns}$$

$$n_0 = 1.40$$

$$n_1 = 0.121$$

Relative signal is equal to $T_s \cos \theta_d$. Note that the relative signal at a rotation angle of $\pm 13^\circ$ is equal to the relative signal at 0° . This is achieved when the maximum efficiency incidence angle, θ_{imax} , is 36.3° .

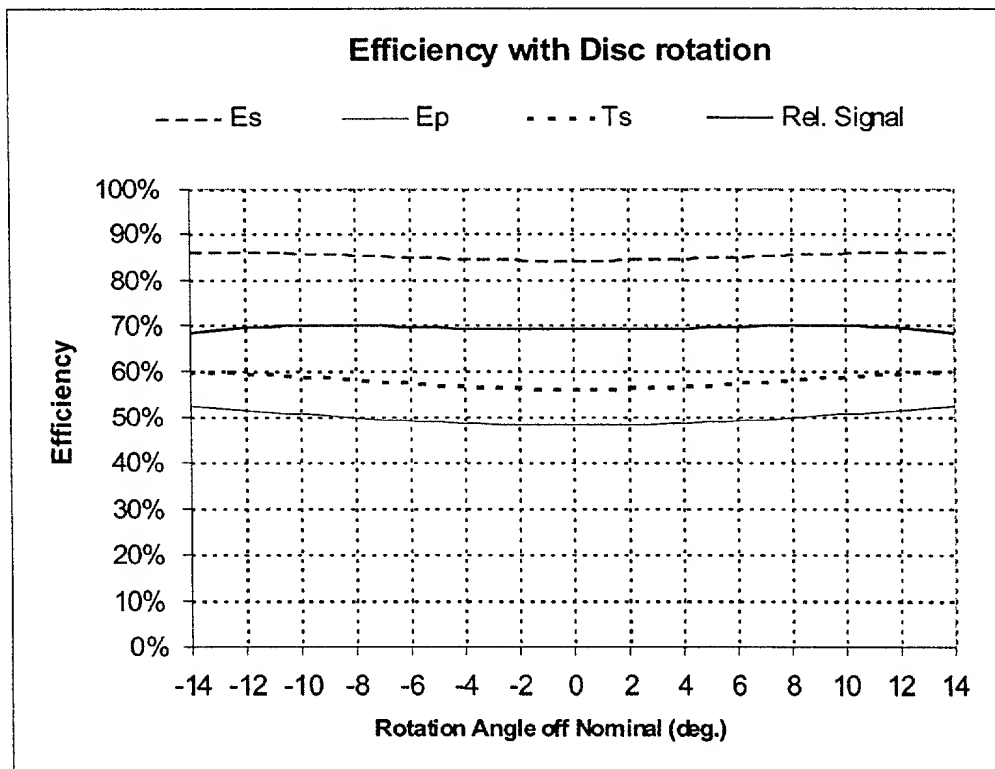


FIG. 10D2

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Diffraction Efficiency Variation with Disc Rotation

Facet 7: before optimization

Fixed design parameters:

$$\theta_i = 38^\circ$$

$$\theta_d = 32^\circ$$

$$\phi_{skew} = 28^\circ$$

$$\lambda_d = 650 \text{ nm}$$

DCG parameters:

$$T = 2.5 \text{ microns}$$

$$n_0 = 1.40$$

$$n_1 = 0.121$$

Relative signal is equal to $T_s \cos \theta_d$. Note that the relative signal falls off as the rotation angle goes from negative to positive. This is for a maximum efficiency incidence angle, θ_{imax} , equal to θ_i (38°). This indicates a non-optimum configuration.

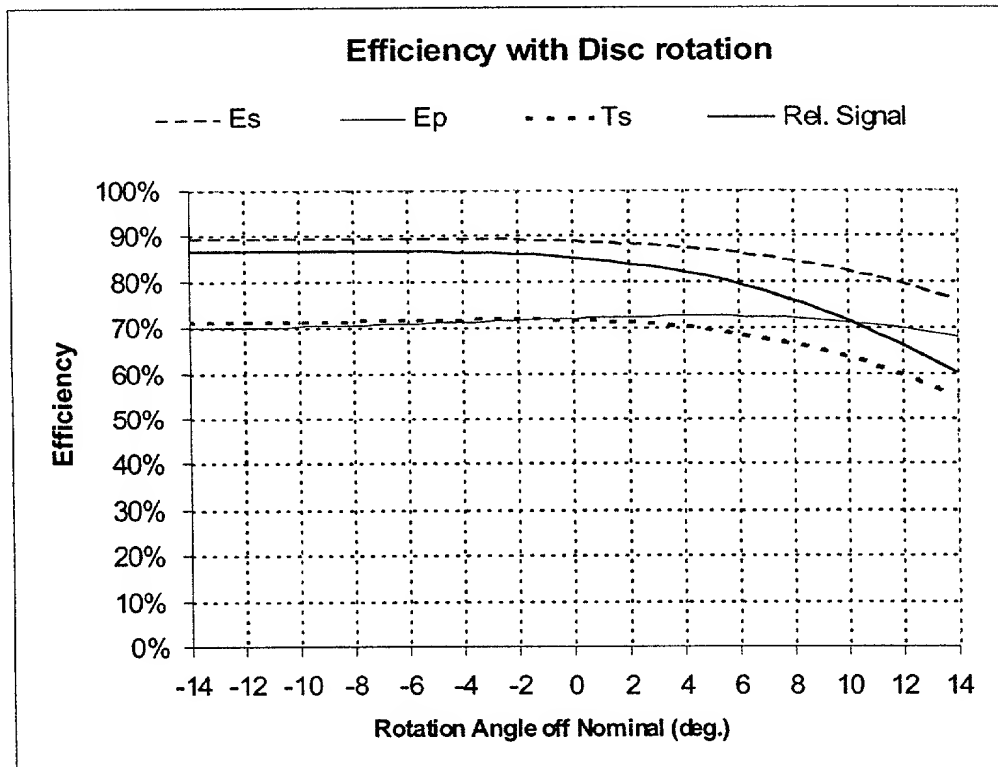


FIG. 10E1

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Diffraction Efficiency Variation with Disc Rotation

Facet 7: after optimization

Fixed design parameters:

$$\theta_i = 38^\circ$$

$$\theta_d = 32^\circ$$

$$\phi_{skew} = 28^\circ$$

$$\lambda_d = 650 \text{ nm}$$

DCG parameters:

$$T = 2.5 \text{ microns}$$

$$n_0 = 1.40$$

$$n_1 = 0.121$$

Relative signal is equal to $T_s \cos \theta_d$. Note that the relative signal at a rotation angle of -14° is equal to the relative signal at $+14^\circ$. This is achieved when the maximum efficiency incidence angle, θ_{imax} , is 35.8° .

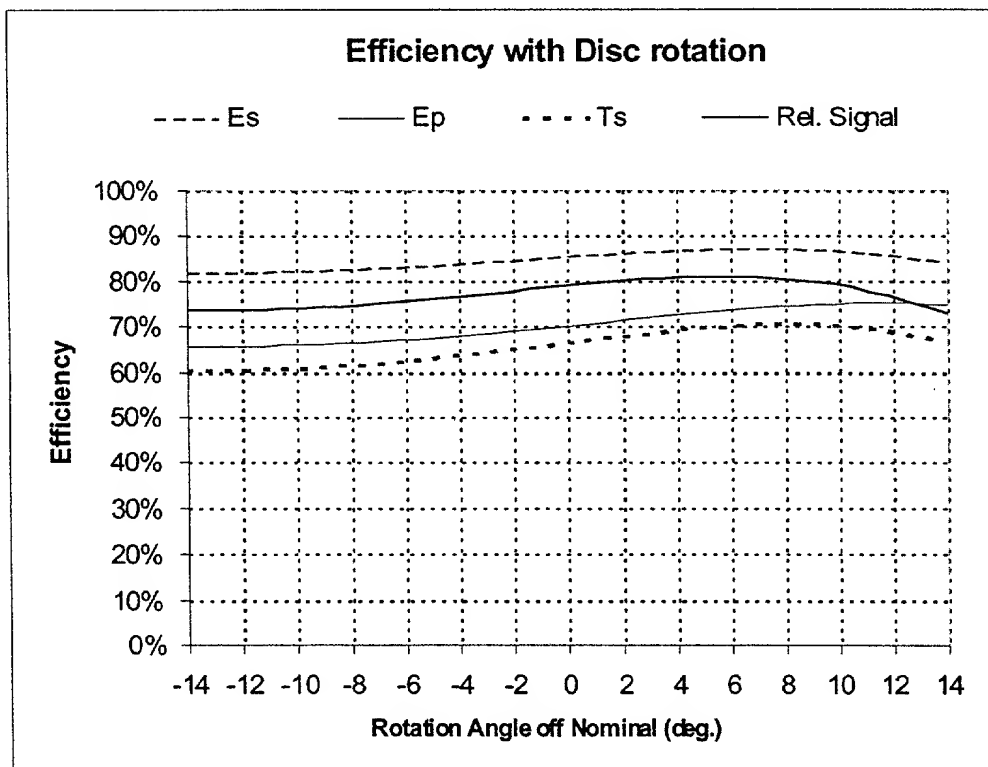


FIG. 10E2

S and P Diffraction Efficiency Calculations

It is assumed that there is no deviation from the nominal wavelength.

Facet-independent design parameters:

Design wavelength: 650 nm
 External incidence angle: 38 deg
 Internal incidence angle: 26.09 deg
 Geletin effective thickness: 2.5 microns
 Average bulk refractive index: 1.4
 Refractive index modulation: 0.121
 S-polarization losses: 10%
 P-polarization losses: 10%
 degrees to radians conversion: 0.017453

Facet	θ_d (deg.)	β (deg.)	ϕ_{skew} (deg.)	d (nm)	θ_{Ro} (deg.)	$\theta_{i,max}$ (deg.)	α_{max} (deg.)	β_{max} (deg.)	$\phi_{s,max}$ (deg.)	ϕ (deg.)	L (nm)	θ_{ROT} (deg.)
1	52.00	34.25	0	463.1	0.00	36.30	25.02	35.43	0.00	84.79	461.2	26.24
2	50.00	33.17	0	470.4	0.00	36.30	25.02	34.34	0.00	85.34	468.9	28.35
3	48.00	32.06	0	478.4	0.00	36.30	25.02	33.21	0.00	85.90	477.1	26.66
4	46.00	30.92	0	486.9	0.00	36.30	25.02	32.05	0.00	86.48	486.0	29.19
5	42.00	28.55	0	505.9	0.00	36.30	25.02	29.66	0.00	87.68	505.5	27.97
6	38.00	26.09	0	527.9	0.00	36.30	25.02	27.17	0.00	88.92	527.8	30.28
7	32.00	22.24	28	584.7	12.93	35.80	24.70	23.45	26.52	90.64	584.6	27.99
8	32.00	22.24	-28	584.7	-12.93	35.80	24.70	23.45	-26.52	90.64	584.6	27.99
9	30.00	20.92	28	600.2	12.52	35.56	24.55	22.26	26.27	91.17	600.1	30.65
10	30.00	20.92	-28	600.2	-12.52	35.56	24.55	22.26	-26.27	91.17	600.1	30.65
11	28.00	19.59	28	617.0	12.08	35.72	24.65	20.83	26.28	91.96	616.6	29.19
12	28.00	19.59	-28	617.0	-12.08	35.72	24.65	20.83	-26.28	91.96	616.6	29.19

FIG. 10F1

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C_R:
0.898

C _S	N	θ_d		β		ϕ_{skew}		Γ		S	
		$-\frac{1}{2}\theta_{ROT}$	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	$+\frac{1}{2}\theta_{ROT}$
0.807	1.718	54.70	54.70	35.66	35.66	-22.98	22.98	0.0634	0.2192	0.0982	0.3397
0.818	1.706	53.05	53.05	34.81	34.81	-25.05	25.05	0.0380	0.2168	0.0581	0.3315
0.829	1.695	50.61	50.61	33.51	33.51	-23.91	23.91	0.0586	0.2143	0.0885	0.3232
0.839	1.684	49.05	49.05	32.65	32.65	-26.45	26.45	0.0285	0.2116	0.0424	0.3150
0.861	1.663	44.69	44.69	30.16	30.16	-26.20	26.20	0.0438	0.2057	0.0636	0.2987
0.882	1.643	41.07	41.07	27.99	27.99	-29.30	29.30	0.0176	0.1992	0.0250	0.2825
0.907	1.620	29.76	29.76	20.76	20.76	-2.39	53.28	0.3498	0.2307	0.4820	0.3180
0.907	1.620	38.91	38.91	26.66	26.66	-53.28	2.39	-0.1618	0.2307	-0.2230	0.3180
0.914	1.614	27.96	27.96	19.57	19.57	-6.49	55.95	0.3549	0.2510	0.4854	0.3432
0.914	1.614	37.62	37.62	25.85	25.85	-55.95	6.49	-0.1726	0.2510	-0.2360	0.3432
0.924	1.605	26.06	26.06	18.29	18.29	-6.05	55.44	0.3252	0.2304	0.4400	0.3118
0.924	1.605	35.04	35.04	24.21	24.21	-55.44	6.05	-0.1470	0.2304	-0.1988	0.3118

FIG. 10F2

[illegible]

κ		E_{par}		E_{perp}		P_{par}		P_{perp}	
$-\frac{1}{2}\theta_{\text{ROT}}$	θ_{Ro}	$-\frac{1}{2}\theta_{\text{ROT}}$	θ_{Ro}	$+\frac{1}{2}\theta_{\text{ROT}}$	θ_{Ro}	$-\frac{1}{2}\theta_{\text{ROT}}$	θ_{Ro}	$+\frac{1}{2}\theta_{\text{ROT}}$	θ_{Ro}
0.5028	0.4948	0.9746	0.9315	0.9746	0.5759	0.5759	0.0580	0.5580	1.0000
0.5187	0.5111	0.9804	0.9369	0.9804	0.5983	0.5983	0.0680	0.5980	1.0000
0.5354	0.5277	0.9814	0.9420	0.9814	0.6192	0.6192	0.0609	0.6091	1.0000
0.5519	0.5445	0.9865	0.9468	0.9865	0.6416	0.6416	0.0733	0.6733	1.0000
0.5860	0.5787	0.9899	0.9552	0.9899	0.6834	0.6834	0.0688	0.6888	1.0000
0.6200	0.6132	0.9945	0.9623	0.9945	0.7248	0.7248	0.0818	0.8188	1.0000
0.6918	0.6843	0.6906	0.9567	0.9773	0.7442	0.7442	0.0004	0.0446	0.9380
0.6906	0.6843	0.6918	0.9567	0.9056	0.7946	0.7946	0.0004	0.0446	0.9380
0.7080	0.7002	0.7068	0.9508	0.9755	0.7720	0.7720	0.0620	0.0620	0.9380
0.7068	0.7002	0.7080	0.9755	0.9508	0.7584	0.7584	0.0587	0.0587	0.9380
0.7227	0.7159	0.7221	0.9220	0.9828	0.8093	0.8093	0.2614	0.2614	0.9413
0.7221	0.7159	0.7227	0.9828	0.9597	0.7823	0.7823	0.0025	0.0025	0.9413
					0.8276	0.8276	0.0555	0.0555	0.9445
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					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.9445
					0.8276	0.8276	0.0025	0.0025	0.9445
					0.8032	0.8032	0.2452	0.2452	0.94

Fig. 10F3

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E_s			E_p			T_s			H_i	Solver (=0)
$-\frac{1}{2}\theta_{ROT}$	θ_{R0}	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	θ_{R0}	$+\frac{1}{2}\theta_{ROT}$	$-\frac{1}{2}\theta_{ROT}$	θ_{R0}	$+\frac{1}{2}\theta_{ROT}$		
85.6%	83.8%	85.6%	53.9%	48.8%	53.9%	59.7%	55.6%	59.7%	1.000	0
85.9%	84.3%	85.9%	56.2%	50.8%	56.2%	61.0%	57.0%	61.0%	0.976	0
86.3%	84.8%	86.3%	57.7%	52.7%	57.7%	62.2%	58.3%	62.2%	0.953	0
86.5%	85.2%	86.5%	60.0%	54.7%	60.0%	63.4%	59.6%	63.4%	0.932	0
87.2%	86.0%	87.2%	63.4%	58.7%	63.4%	65.7%	62.2%	65.7%	0.894	0
87.5%	86.6%	87.5%	67.2%	62.5%	67.2%	67.7%	64.6%	67.7%	0.861	0
81.5%	85.1%	83.9%	67.0%	70.5%	75.5%	60.5%	66.2%	66.9%	0.840	0.020396813
83.9%	85.1%	81.5%	75.5%	70.5%	67.0%	66.9%	66.2%	60.5%	0.840	0.020396813
81.4%	84.7%	83.9%	68.3%	71.4%	76.7%	60.9%	66.1%	67.4%	0.841	0.02187036
83.9%	84.7%	81.4%	76.7%	71.4%	68.3%	67.4%	66.1%	60.9%	0.841	0.02187036
82.9%	85.6%	85.0%	70.4%	73.1%	77.9%	63.6%	67.9%	69.3%	0.819	0.019325482
85.0%	85.6%	82.9%	77.9%	73.1%	70.4%	69.3%	67.9%	63.6%	0.819	0.019325482

0.255193744

Figure 10F4

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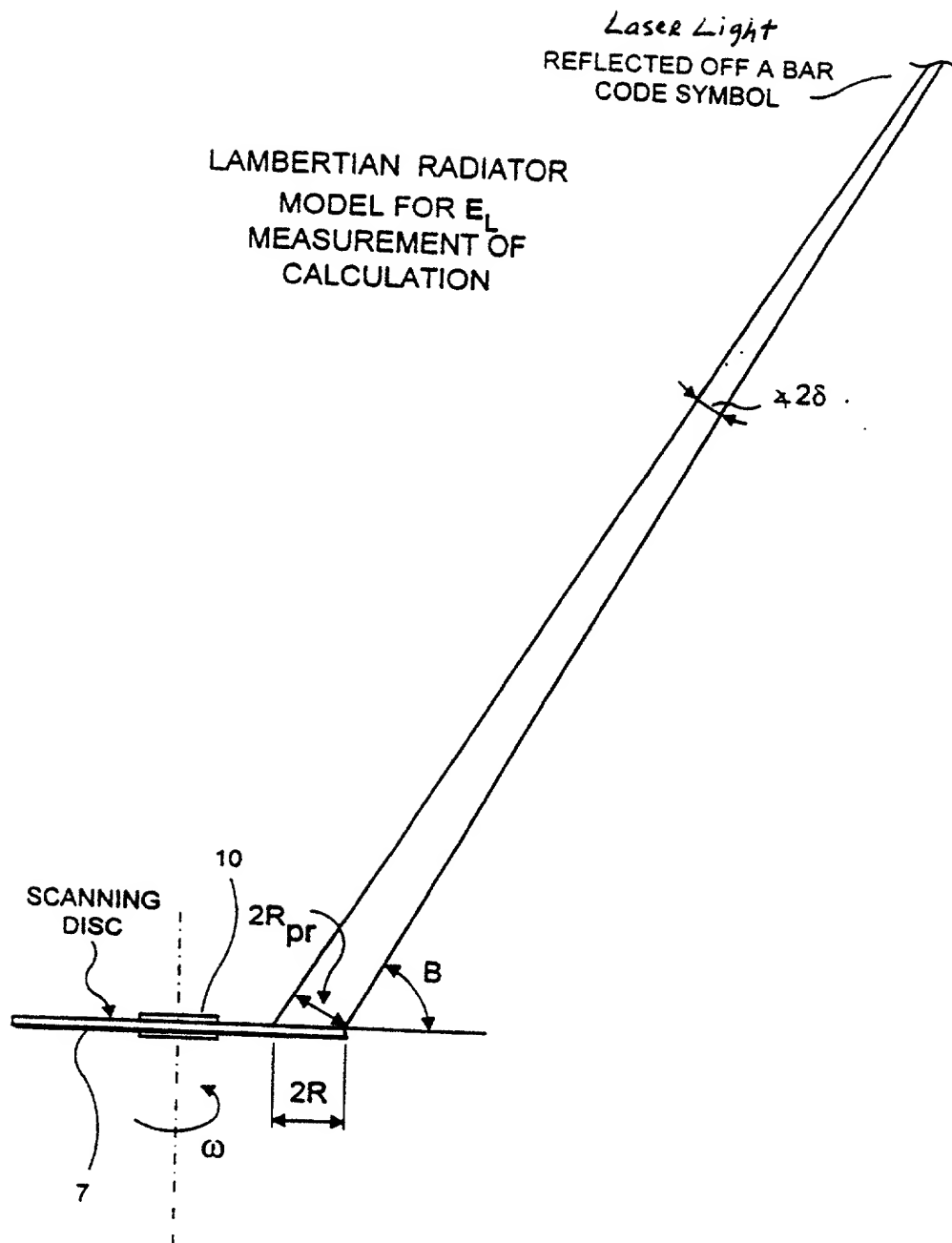


FIG. 10G1

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FACET LIGHT COLLECTION EFFICIENCY

- Z = DISTANCE FROM SCAN POINT ON LABEL (MAX = FOCAL)
LENGTH PLUS 5 INCHES
- Area = AREA OF CORRESPONDING FACET
- R = RADIUS OF EFFECTIVE CIRCULAR APERTURE
- R.pr = RADIUS OF PROJECTED EFFECTIVE CIRCULAR APERTURE
- B = ANGLE BETWEEN OUTGOING BEAM AND THE DISC
- δ = HALF-ANGLE SUBTENDED BY EFFECTIVE PROJECTED
CIRCULAR APERTURE
- E.L = LAMBERTIAN LIGHT COLLECTION EFFICIENCY

FIG. 10G2

$$R_{pr} : = \sqrt{\frac{\text{Area} \sin B}{\pi}}$$

$$\delta : = \text{atan} \left[\frac{R_{pr}}{Z} \right]$$

$$E_L : = (\sin (\delta))^2$$

FIG. 10G3

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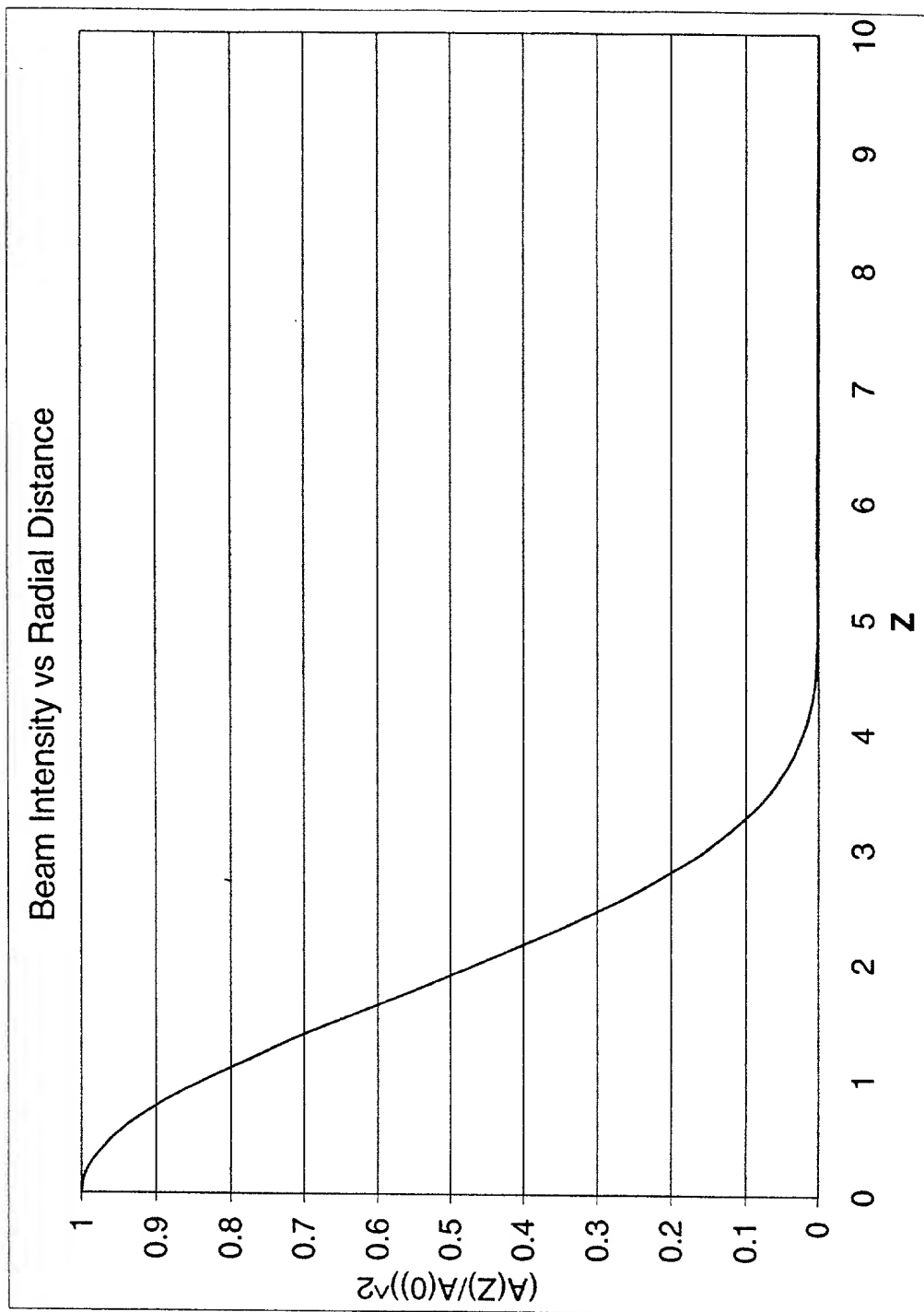


FIG. 11A2

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FIG 11B1

COZZE OUT

$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{y}} \right) = \frac{\partial L}{\partial y}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{z}} \right) = \frac{\partial L}{\partial z}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\theta}} \right) = \frac{\partial L}{\partial \theta}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\phi}} \right) = \frac{\partial L}{\partial \phi}$
$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\psi}} \right) = \frac{\partial L}{\partial \psi}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\chi}} \right) = \frac{\partial L}{\partial \chi}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\eta}} \right) = \frac{\partial L}{\partial \eta}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\xi}} \right) = \frac{\partial L}{\partial \xi}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\zeta}} \right) = \frac{\partial L}{\partial \zeta}$
$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\delta}} \right) = \frac{\partial L}{\partial \delta}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\gamma}} \right) = \frac{\partial L}{\partial \gamma}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\beta}} \right) = \frac{\partial L}{\partial \beta}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\alpha}} \right) = \frac{\partial L}{\partial \alpha}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\lambda}} \right) = \frac{\partial L}{\partial \lambda}$
$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\mu}} \right) = \frac{\partial L}{\partial \mu}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\nu}} \right) = \frac{\partial L}{\partial \nu}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\kappa}} \right) = \frac{\partial L}{\partial \kappa}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\iota}} \right) = \frac{\partial L}{\partial \iota}$	$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{\jmath}}$

Figure 6

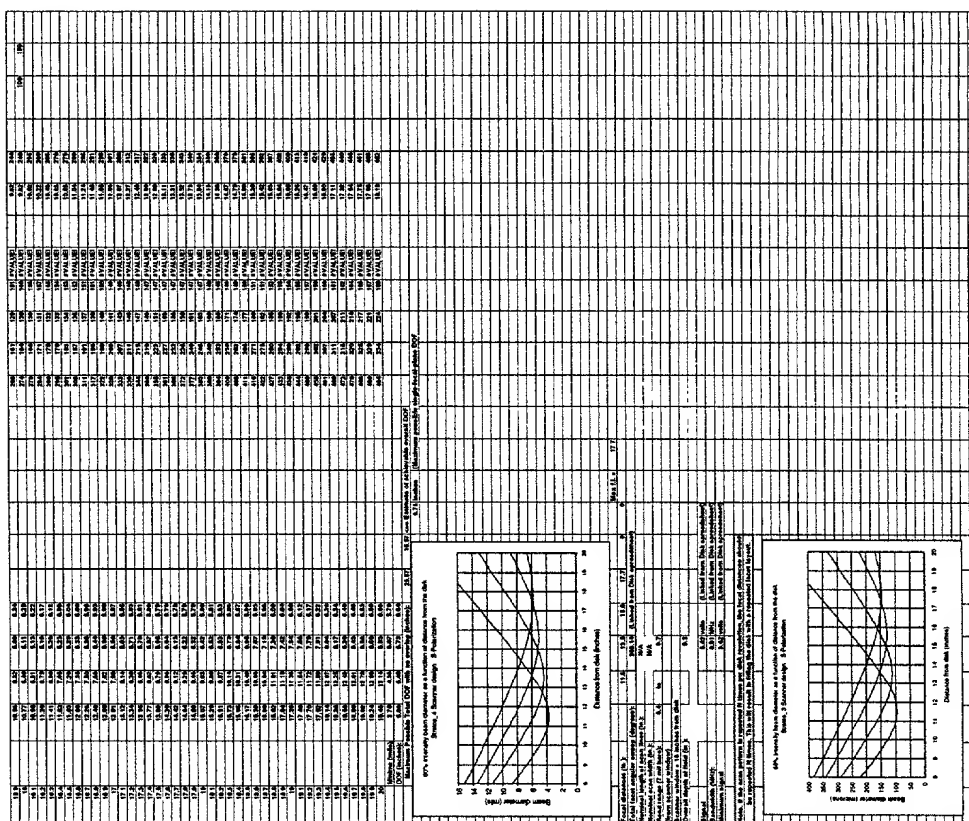


FIG. 11B2

L. 3/23/00

60% intensity beam diameter as a function of distance from the disk
Stratos_4 Scanner design - S-Polarization

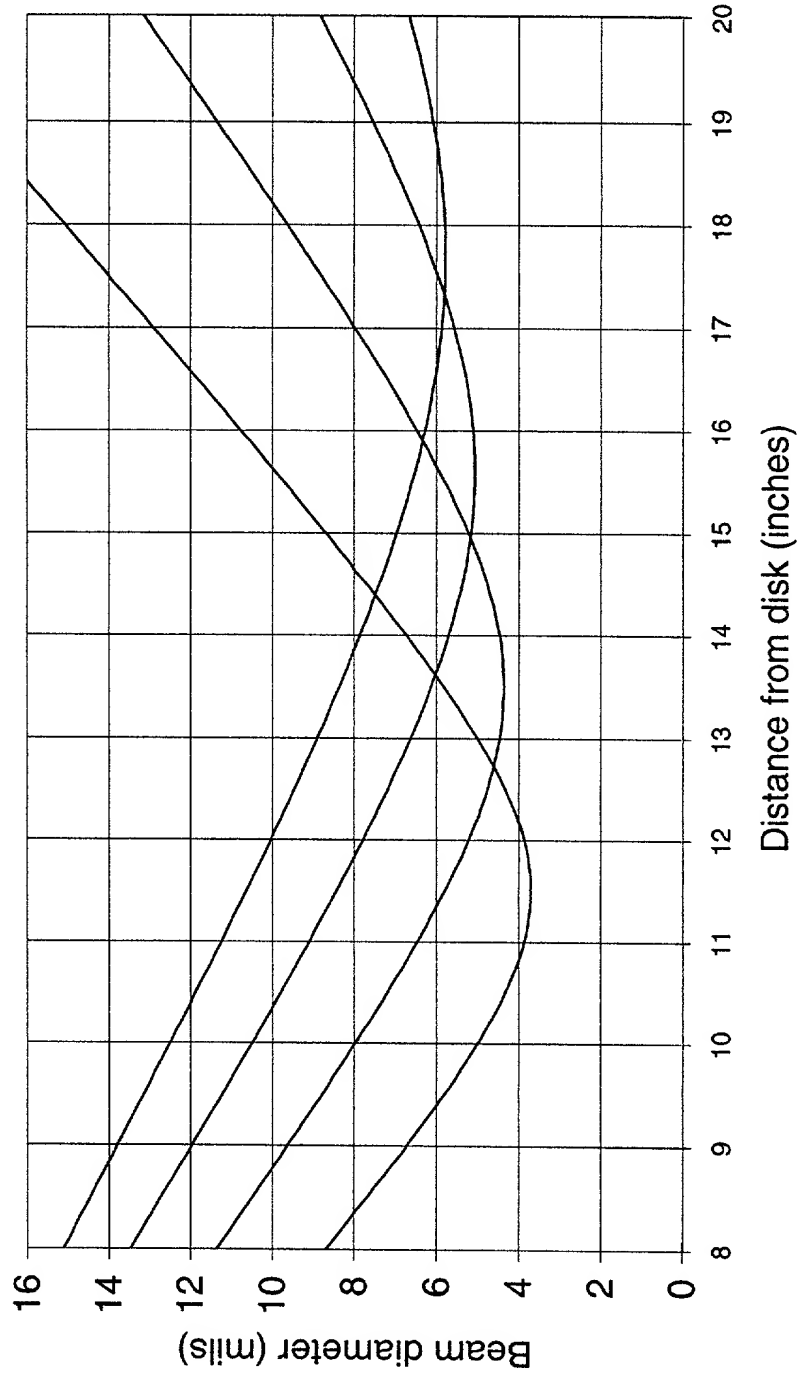


FIG. 11B3

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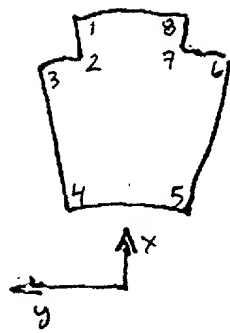


FIG. 12A1



FIG. 12A2

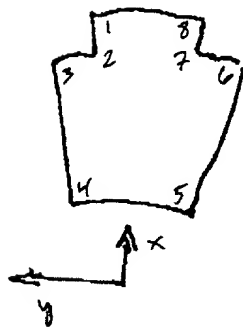


FIG. 12B1

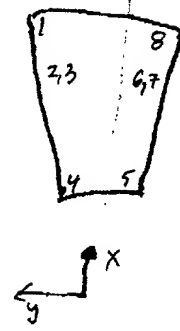


FIG. 12B2

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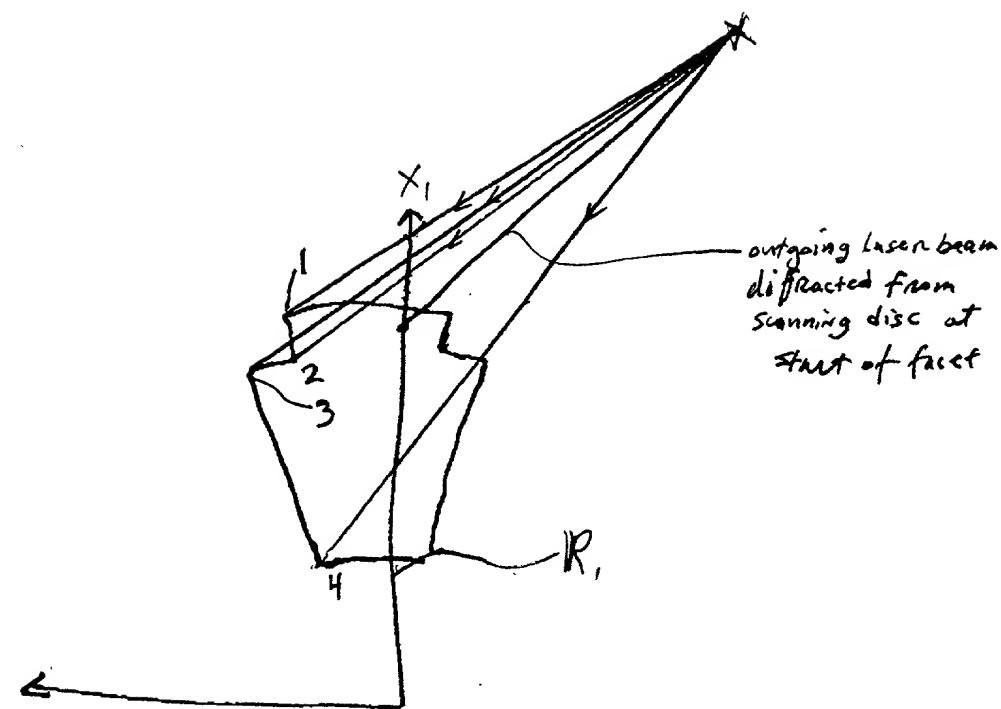


FIG. 12C1

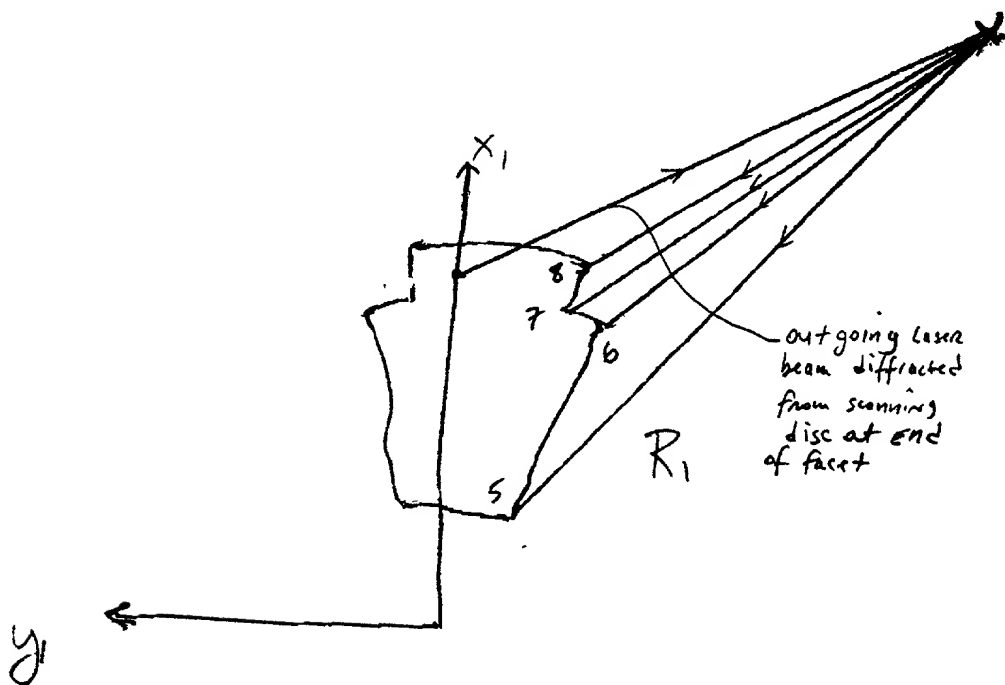


FIG. 12C2

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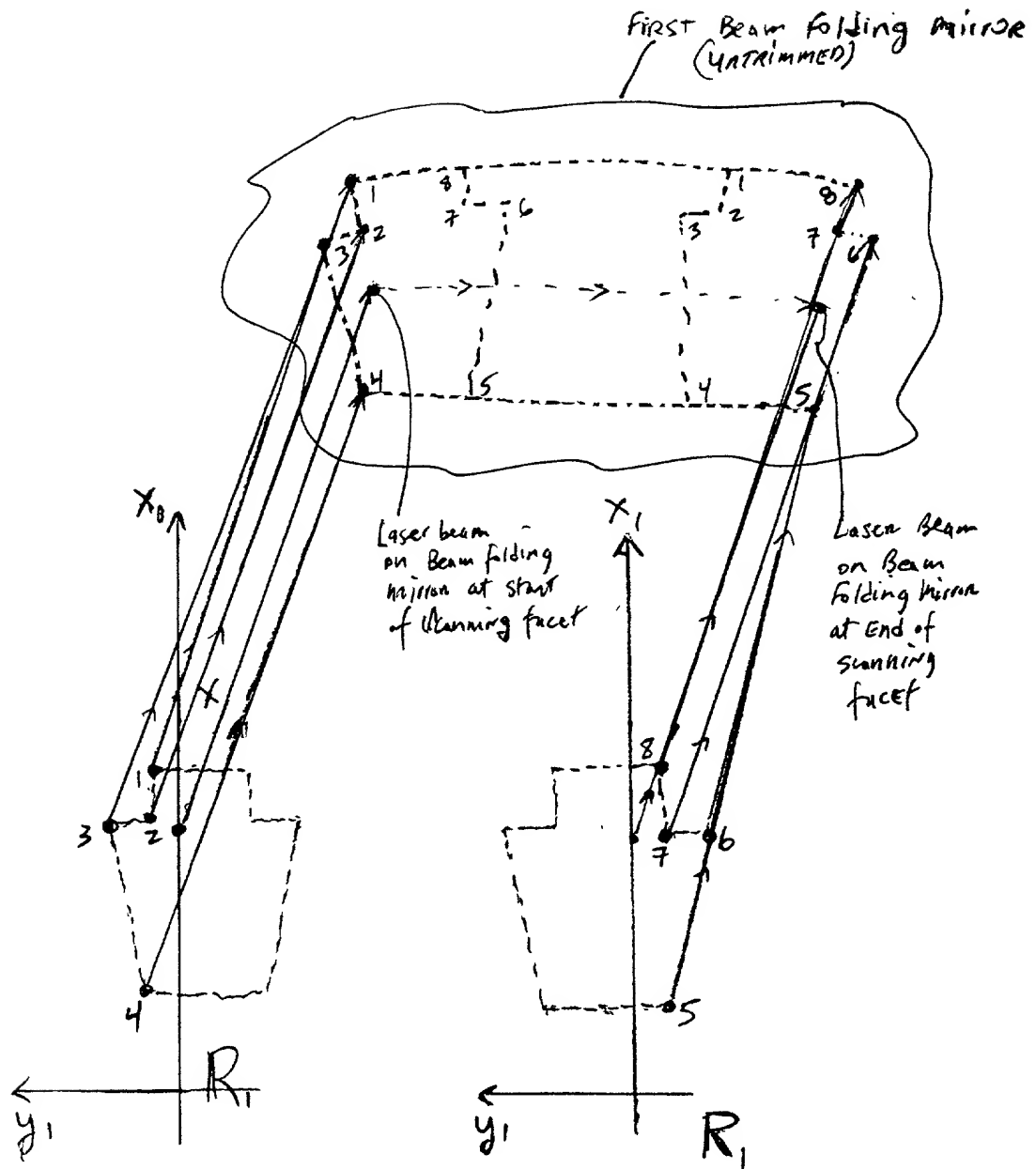


FIG 12D

2.96/335

	A	B	C	D	E	F	G	H	I	J
75		1			2			3		
76		Facet			Facet			Facet		
77	G1	8			10			12		
78	Point 1	3.94874	-0.02294	2.12380	3.83250	0.07718	2.09937	3.75358	0.10925	2.09325
79	Point 2	3.65113	-0.12038	2.16443	3.53978	-0.02665	2.14166	3.45010	0.00887	2.13498
80	Point 3	3.61581	-0.03502	2.14098	3.53978	-0.02665	2.14166	3.44555	0.02059	2.13175
81	Point 4	2.64691	-0.40575	2.28887	2.88384	-0.25930	2.23643	2.44051	-0.31915	2.27208
82	Point 5	2.79472	-1.59304	2.62907	3.02644	-1.72489	2.65801	2.54066	-1.56107	2.63017
83	Point 6	3.81419	-2.04371	2.71867	3.69455	-2.02106	2.71697	3.56179	-2.02254	2.72286
84	Point 7	3.82907	-1.96478	2.69504	3.69455	-2.02106	2.71697	3.56439	-2.01174	2.71960
85	Point 8	4.13065	-2.08452	2.71758	3.98553	-2.15005	2.74265	3.86380	-2.14515	2.74622
86	Point 9	3.94874	-0.02294	2.12380	3.83250	0.07718	2.09937	3.75358	0.10925	2.09325
87	Start of scan line	4.02545	-0.67817	2.31174	3.92247	-0.62341	2.30000	3.82454	-0.57134	2.28883
88	Middle of rotation	4.02545	-0.67817	2.31174	3.92247	-0.62341	2.30000	3.82454	-0.57134	2.28883
89	End of scan line	4.04162	-1.16307	2.45250	3.92934	-1.15960	2.45580	3.81937	-1.12321	2.44999
90										

FIG 13A1

MR1

Station 1

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	A	B	C	D	E	F	G	H	I	J
91		Facet			Facet			Facet		
92 G2		7			9			11		
93	Point 1	4.02247	2.19033	2.58609	3.91799	2.45353	2.76685	3.80802	2.74420	2.96322
94	Point 2	3.79236	2.11753	2.69195	3.69690	2.36537	2.86040	3.58337	2.64904	3.05579
95	Point 3	3.78639	2.20453	2.73451	3.69690	2.36537	2.86040	3.58162	2.66095	3.06217
96	Point 4	3.05197	1.92230	3.05003	3.21262	2.17226	3.06533	2.85731	2.34705	3.35743
97	Point 5	2.64347	-0.27369	2.31221	2.81913	-0.34045	2.17660	2.54140	-0.10460	2.44937
98	Point 6	3.25774	-0.84215	1.68794	3.25935	-0.70440	1.74867	3.23044	-0.61969	1.80401
99	Point 7	3.29896	-0.76438	1.69797	3.25935	-0.70440	1.74867	3.23562	-0.60869	1.80582
100	Point 8	3.50262	-0.93172	1.50046	3.46547	-0.87482	1.54830	3.45674	-0.77127	1.59994
101	Point 9	4.02247	2.19033	2.58609	3.91799	2.45353	2.76685	3.80802	2.74420	2.96322
102	Start of scan line	3.88910	1.13139	2.19201	3.81752	1.25640	2.29108	3.73628	1.40993	2.40874
103	Middle of rotation	3.83943	0.57926	1.97459	3.76954	0.54210	2.00000	3.70069	0.50549	2.02503
104	End of scan line	3.77386	0.09914	1.79899	3.72144	0.14315	1.85024	3.66728	0.18290	1.90064
105										

FIG. 13A2

MR1

Station 1

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	A	B	C	D	E	F	G	H	I	J	K	L	M
106		Facet 1			Facet 2			Facet 3			Facet 4		
107	G3												
108	Point 1	5.11617	1.95380	1.89155	5.01400	1.88093	1.96715	4.92433	1.81870	2.03365	4.82799	1.75935	2.10576
109	Point 2	4.98460	1.86904	1.89969	4.88136	1.79109	2.06571	4.77964	1.72980	2.14196	4.68407	1.66502	2.21298
110	Point 3	4.94695	2.08109	2.03847	4.88064	1.79549	2.06667	4.75362	1.86942	2.17507	4.68407	1.66502	2.21298
111	Point 4	4.55990	1.69707	2.31542	4.46955	1.51422	2.37191	4.31720	1.51260	2.49402	4.34215	1.44090	2.46771
112	Point 5	4.35785	-1.63559	2.18575	4.29296	-1.52325	2.24765	4.14486	-1.55897	2.36336	4.17995	-1.53887	2.33696
113	Point 6	4.71038	-2.01784	1.86940	4.88022	-1.80322	1.91239	4.54753	-1.91413	2.00915	4.50146	-1.76326	2.05933
114	Point 7	4.77395	-1.80620	1.83693	4.88147	-1.79883	1.91177	4.59009	-1.77513	1.98718	4.50146	-1.76326	2.05933
115	Point 8	4.89971	-1.89063	1.72862	4.80732	-1.88882	1.80291	4.72764	-1.86391	1.86903	4.63750	-1.85821	1.94186
116	Point 9	5.11617	1.95380	1.89155	5.01400	1.88093	1.96715	4.92433	1.81870	2.03365	4.82799	1.75935	2.10576
117	Start of scan line	5.11614	1.00830	1.80878	5.02116	0.94389	1.87935	4.92928	0.88565	1.94798	4.84129	0.83137	2.01383
118	Middle of rotation	5.03523	0.00000	1.78542	4.95474	0.00000	1.85000	4.87537	0.00000	1.91389	4.79689	0.00000	1.97666
119	End of scan line	5.00807	-0.96140	1.72464	4.92129	-0.94701	1.79393	4.83778	-0.91710	1.86356	4.76656	-0.89961	1.93026
120													

FIG. 13A3

MR1

Station 1

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Station 1 M1- XY Plane

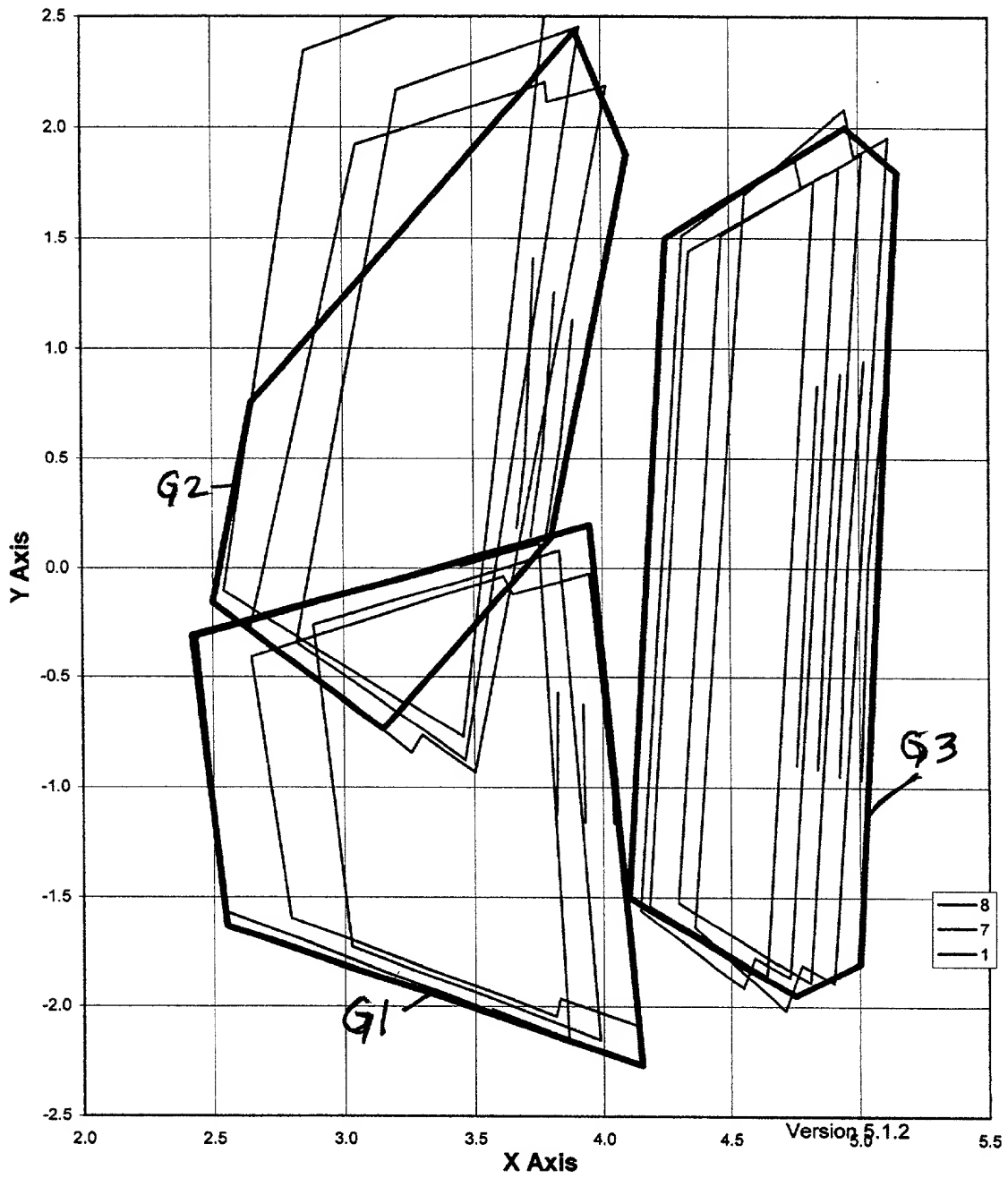


FIG. 13A4

Station 1

MR1.xy

Station 1 M1 - XZ Plane

Station 1 M1 - XZ Plane

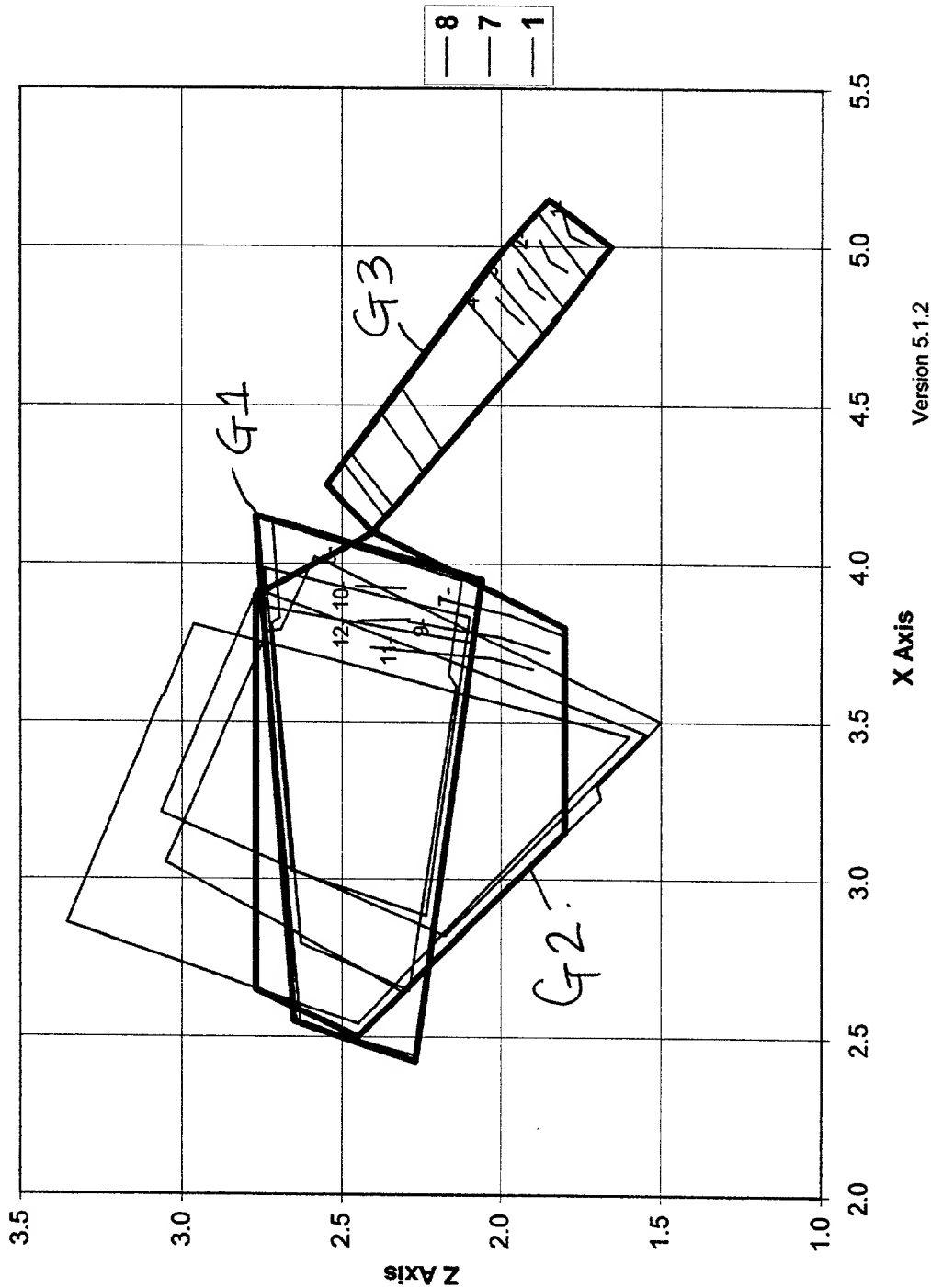


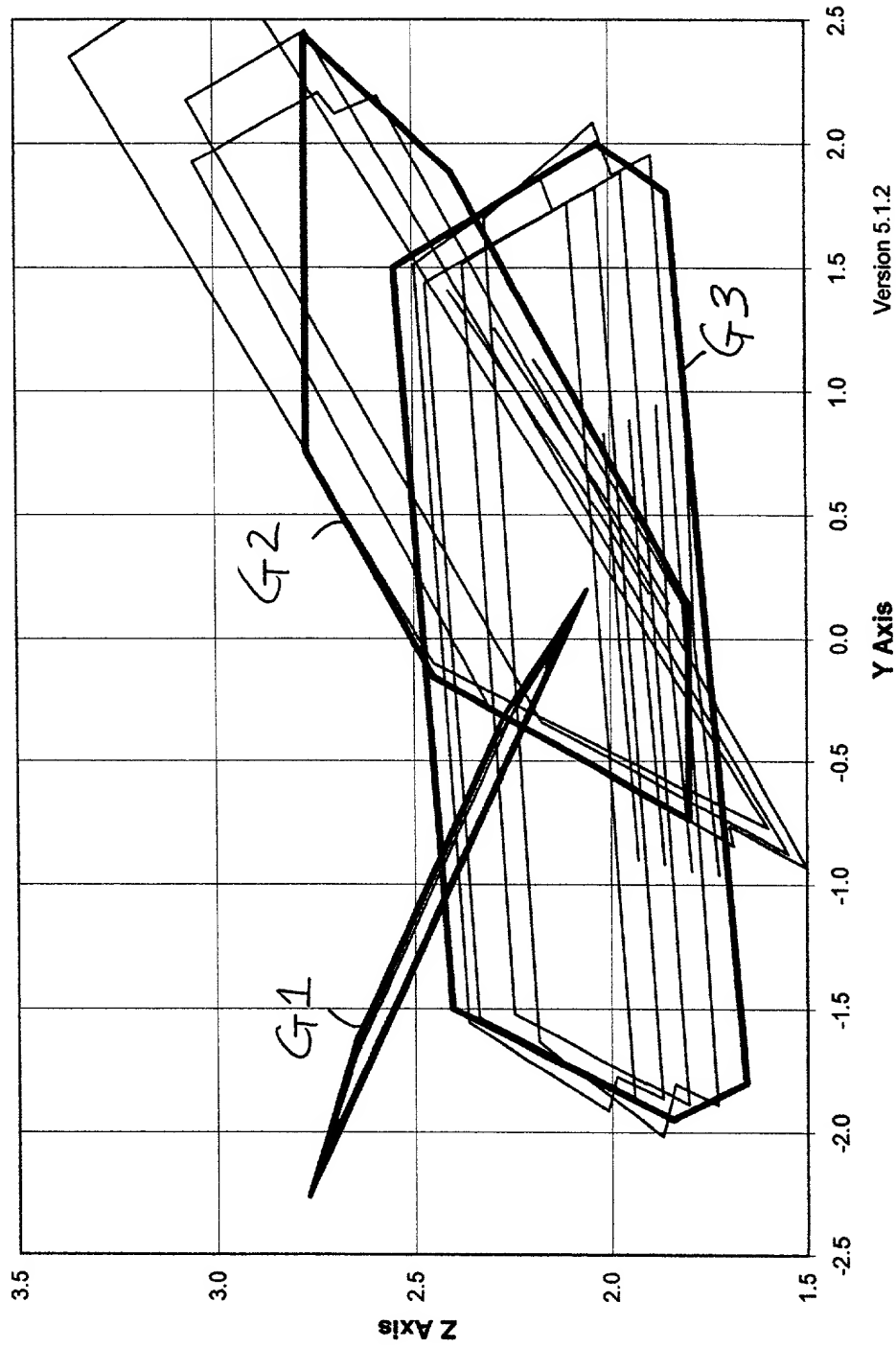
FIG. 13A5

MR1.xz

Station 1

Station 1 M1 - YZ Plane

Station 1 M1 - YZ Plane



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FIG. 13A6

Station 1

MR1.yz4/3/00

Version 5.1.2

Station 1

	A	B	C	D	E	F	G	H	I	J
91		Facet			Facet			Facet		
92	G2	7			9			11		
93	Point 1	3.38194	4.20092	1.75395	3.24016	4.43917	2.01655	3.11010	4.72655	2.34142
94	Point 2	3.16298	4.26385	1.78738	3.03125	4.49361	2.04162	2.88665	4.78740	2.37142
95	Point 3	3.16739	4.30137	1.83403	3.03125	4.49361	2.04162	2.88663	4.79258	2.37774
96	Point 4	2.50443	4.46930	1.90767	2.59900	4.60627	2.09349	2.21545	4.97231	2.46415
97	Point 5	1.39822	2.79582	-0.35302	1.44696	2.82994	-0.30174	1.08385	3.11226	-0.02918
98	Point 6	1.81707	2.39729	-0.75633	1.73748	2.57459	-0.55577	1.56833	2.71448	-0.41858
99	Point 7	1.85962	2.41646	-0.72451	1.73748	2.57459	-0.55577	1.57414	2.71711	-0.41422
100	Point 8	2.00251	2.29151	-0.84867	1.87437	2.45426	-0.67547	1.73191	2.58895	-0.53935
101	Point 9	3.38194	4.20092	1.75395	3.24016	4.43917	2.01655	3.11010	4.72655	2.34142
102	Start of scan line	3.14045	3.84670	1.27398	3.00728	4.05126	1.49719	2.86346	4.28889	1.75864
103	Middle of rotation	2.81784	3.26851	0.50471	2.60000	3.30000	0.50000	2.37384	3.33269	0.49511
104	End of scan line	2.37758	2.63817	-0.35149	2.22734	2.77029	-0.22004	2.06736	2.89843	-0.09537
105										

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FIG. 13B2

[illegible]

Flt. 13B3

Station 1

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Station 1 M2- XY Plane

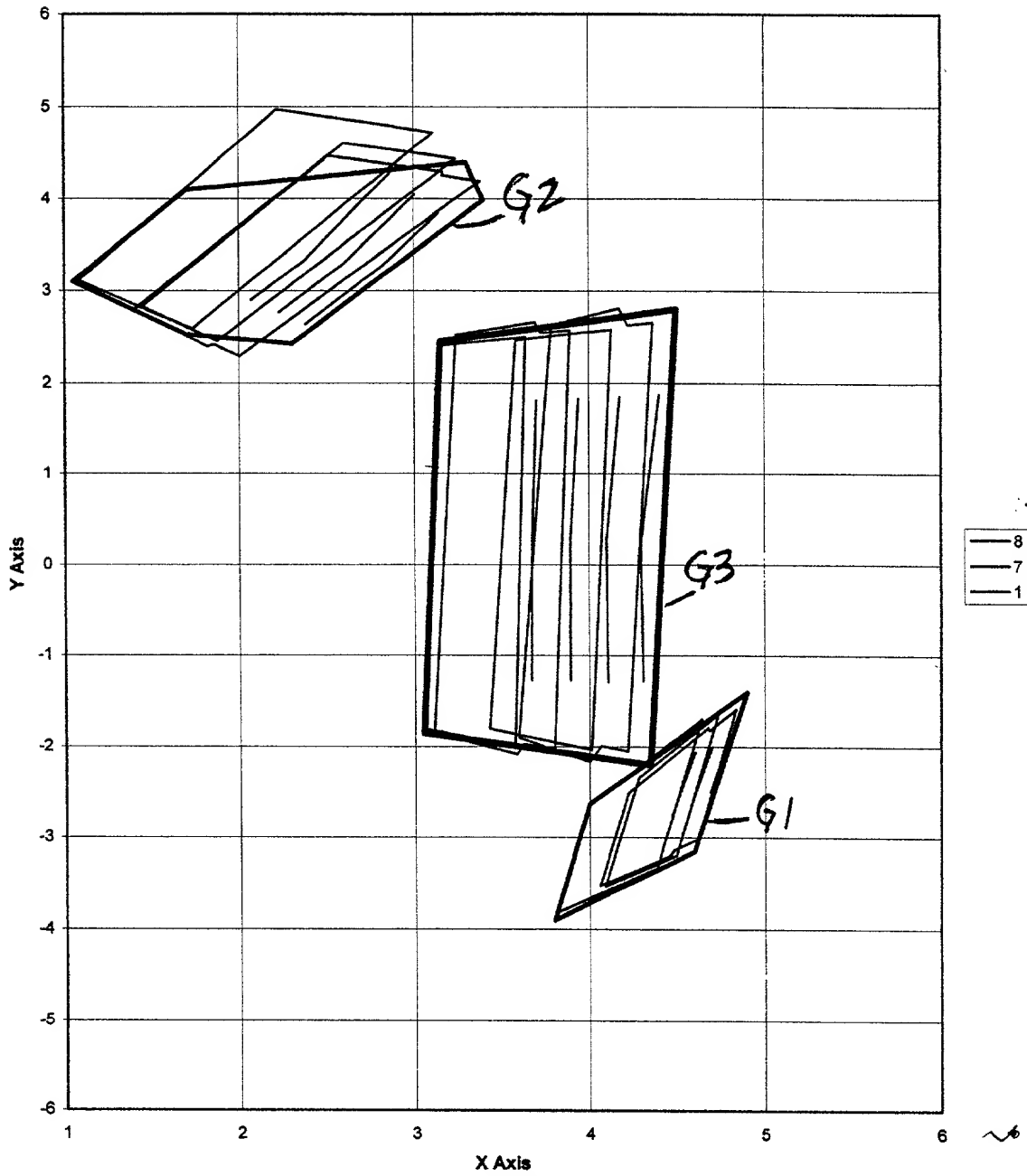


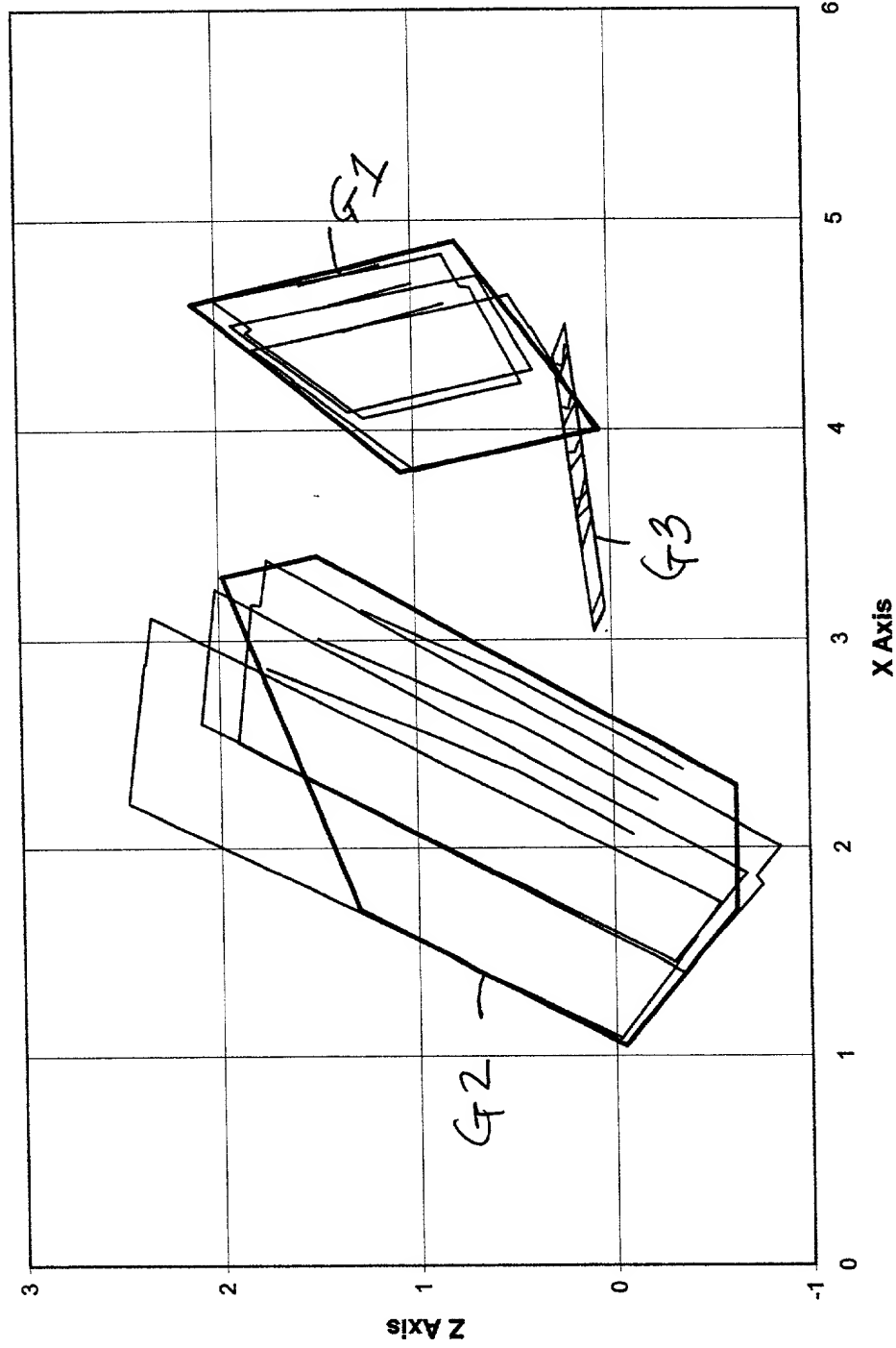
FIG. 13B4

Station 1

MR2.xv

Station 1 M2 - XZ Plane

Station 1 M2 - XZ Plane



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FIG. 13B5

MR2.XZ

Station 1

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8
7
1

Station 1 M2 - YZ Plane

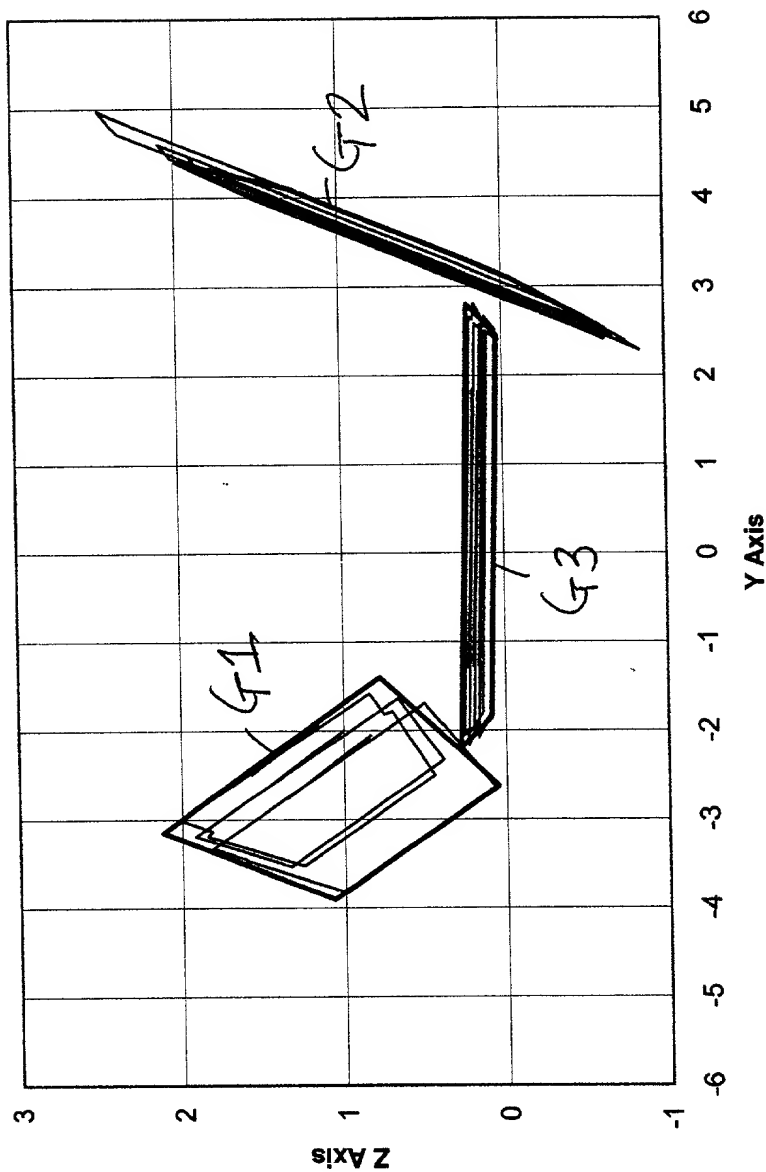


FIG. 13B6

MR2.yz

Station 1

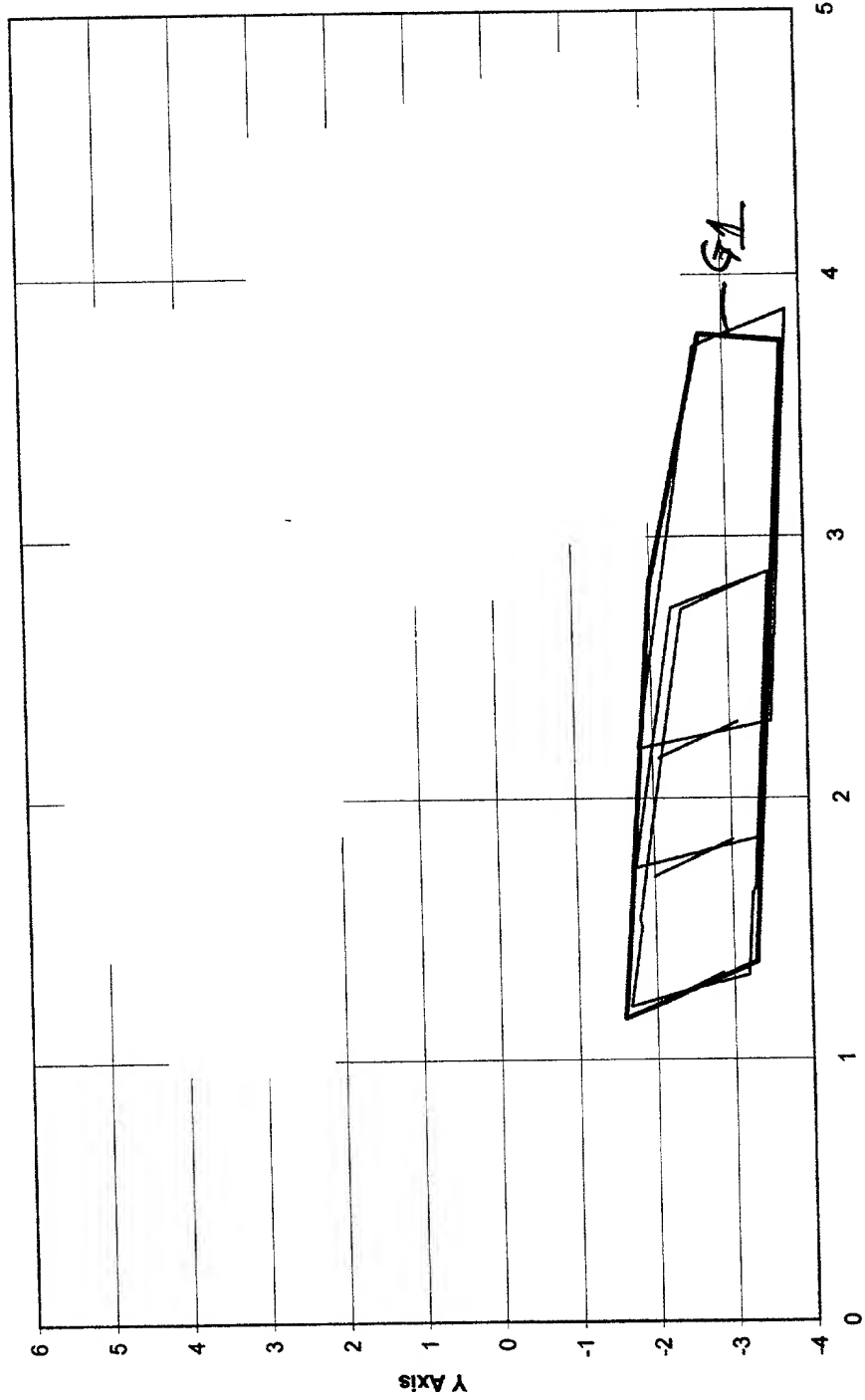
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	A	B	C	D	E	F	G	H	I	J
76		Facet			Facet			Facet		
77	G1	8			10			12		
78	Point 1	1.20537	-1.67340	0.83287	1.73454	-1.76256	0.57847	2.18607	-1.81295	0.33975
79	Point 2	1.50717	-1.82194	0.77007	2.01252	-1.90575	0.52600	2.50076	-1.97962	0.28421
80	Point 3	1.53373	-1.80077	0.73570	2.01252	-1.90575	0.52600	2.50470	-1.97622	0.27888
81	Point 4	2.71992	-2.40114	0.50283	2.72609	-2.27331	0.39129	3.72651	-2.62604	0.06549
82	Point 5	2.86809	-3.52973	1.36131	2.87153	-3.57274	1.39541	3.86534	-3.82116	0.98584
83	Point 6	1.66004	-3.29877	1.91900	2.13984	-3.43596	1.73579	2.62296	-3.60007	1.57321
84	Point 7	1.63442	-3.25853	1.90105	2.13984	-3.43596	1.73579	2.61924	-3.59386	1.57029
85	Point 8	1.32257	-3.19447	2.04127	1.85089	-3.38194	1.87021	2.29384	-3.53522	1.72352
86	Point 9	1.20537	-1.67340	0.83287	1.73454	-1.76256	0.57847	2.18607	-1.81295	0.33975
87	Start of scan line	1.19058	-1.90430	1.03659	1.70000	-2.00000	0.80000	2.15170	-2.08486	0.59022
88	Middle of rotation	1.19058	-1.90430	1.03659	1.70000	-2.00000	0.80000	2.15170	-2.08486	0.59022
89	End of scan line	1.33110	-2.85916	1.75349	1.84105	-3.01433	1.56667	2.29073	-3.10310	1.36142
90										

FIG. 13C1

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Station 1 M3- XY Plane



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8
7
6

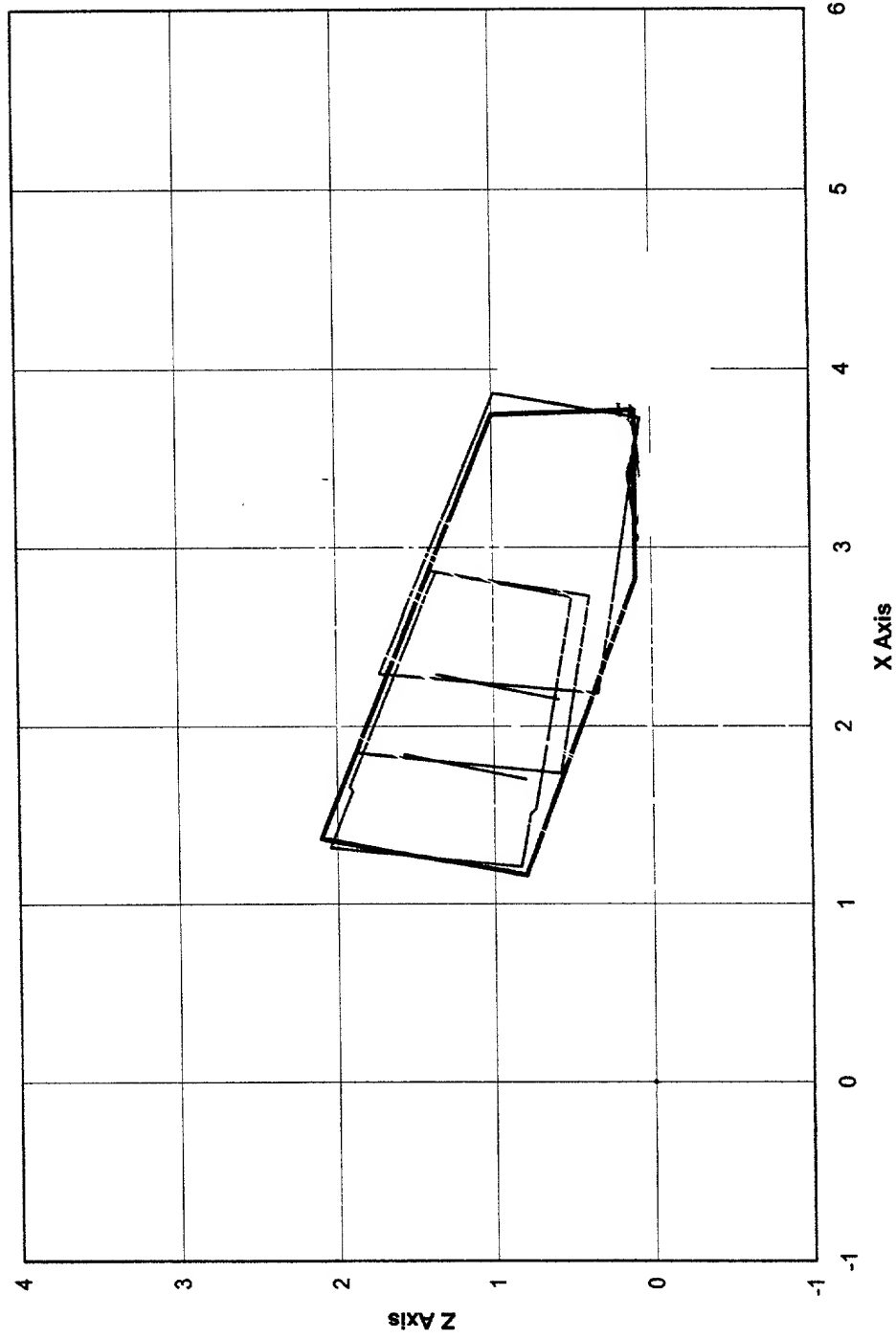
FIG. 13C2

MR3.xy

Station 1

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Station 1 M3 - XZ Plane



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FIG. 13C3

Station 1

MR3.xz

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8
7
1

Station 1 M3 - YZ Plane

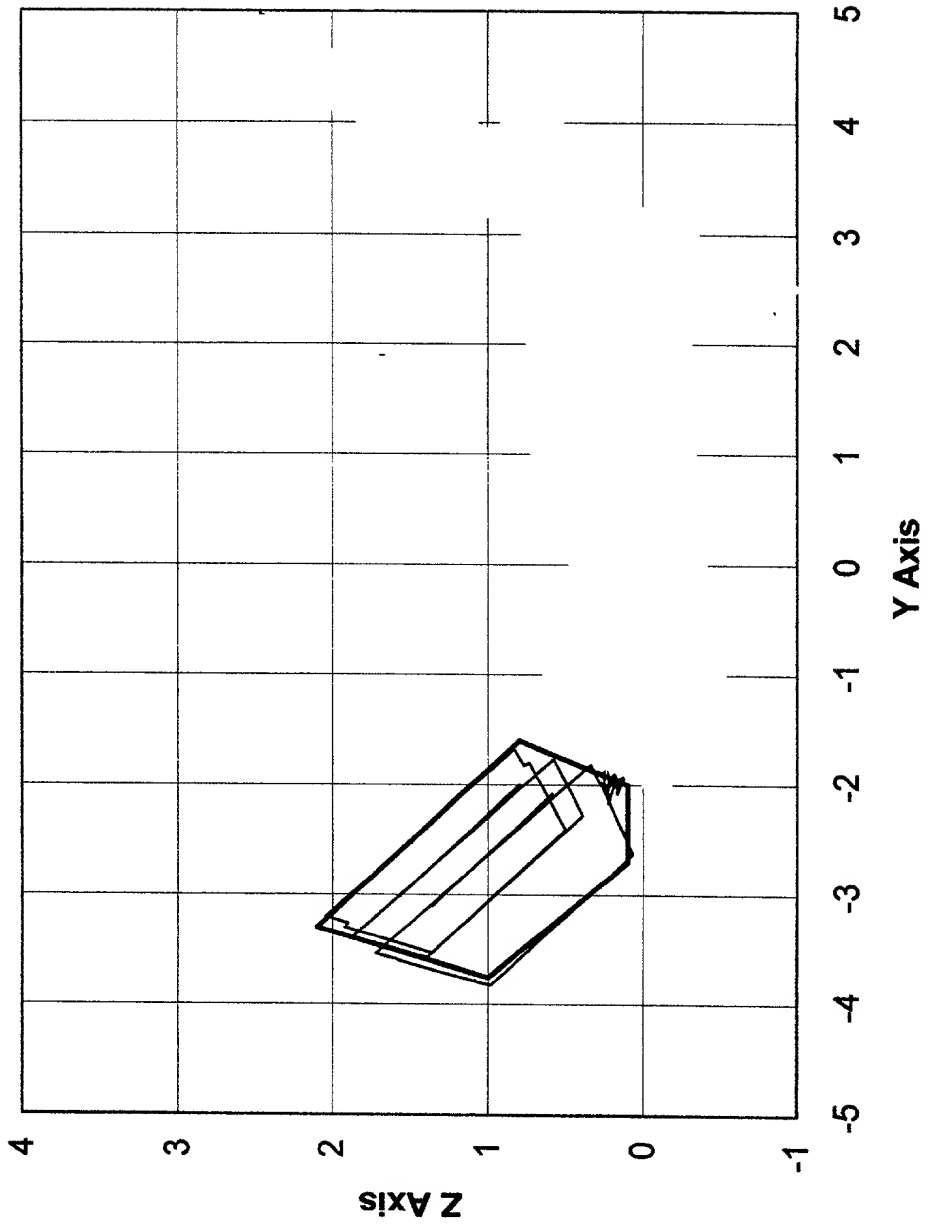


FIG. 13C4

MR3.yz

Station 1

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	A	B	C	D	E	F	G	H	I	J
75		1			2			3		
76		Facet			Facet			Facet		
77	G1	8			10			12		
78	Point 1	1.20537	-1.67340	0.83287	1.73454	-1.76256	0.57847	2.18607	-1.81295	0.33975
79	Point 2	1.50717	-1.82194	0.77007	2.01252	-1.90575	0.52600	2.50076	-1.97962	0.28421
80	Point 3	1.53373	-1.80077	0.73570	2.01252	-1.90575	0.52600	2.50470	-1.97622	0.27888
81	Point 4	2.71992	-2.40114	0.50283	2.72609	-2.27331	0.39129	3.72651	-2.62604	0.06549
82	Point 5	2.86809	-3.52973	1.36131	2.87153	-3.57274	1.39541	3.86534	-3.82116	0.98584
83	Point 6	1.66004	-3.29877	1.91900	2.13984	-3.43596	1.73579	2.62296	-3.60007	1.57321
84	Point 7	1.63442	-3.25853	1.90105	2.13984	-3.43596	1.73579	2.61924	-3.59386	1.57029
85	Point 8	1.32257	-3.19447	2.04127	1.85089	-3.38194	1.87021	2.29384	-3.53522	1.72352
86	Point 9	1.20537	-1.67340	0.83287	1.73454	-1.76256	0.57847	2.18607	-1.81295	0.33975
87	Start of scan line	1.19058	-1.90430	1.03659	1.70000	-2.00000	0.80000	2.15170	-2.08486	0.59022
88	Middle of rotation	1.19058	-1.90430	1.03659	1.70000	-2.00000	0.80000	2.15170	-2.08486	0.59022
89	End of scan line	1.33110	-2.85916	1.75349	1.84105	-3.01433	1.56667	2.29073	-3.10310	1.36142
90										

FIG. 13D1

[illegible]

FIG. 14A1

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FLG. 14B1

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FIG. 14D1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
		Facet 1			Facet 2			Facet 3			Facet 4			Facet 5			Facet 6		
106																			
107	G3	4.82498	0.44237	0.28978	4.65503	0.44811	0.22157	4.49179	0.44459	0.17770	4.30775	0.44954	0.12583	3.93952	0.44834	0.02505	3.52125	0.44891	-0.08894
108		4.68874	0.36963	0.24652	4.50103	0.37345	0.19944	4.31949	0.37132	0.15017	4.14124	0.37427	0.10044	3.74647	0.37385	-0.00784	3.32508	0.37322	-0.12337
109		4.62718	0.54611	0.18746	4.50022	0.37701	0.19826	4.28811	0.48536	0.11104	4.14124	0.37427	0.10044	3.74516	0.37803	-0.00833	3.32508	0.37322	-0.12337
110		4.18842	0.22763	0.15299	4.04652	0.15472	0.13371	3.79612	0.20147	0.05234	3.76369	0.20353	0.04285	3.17535	0.15541	-0.10568	2.98199	0.24084	-0.18182
111		4.28176	-2.24588	0.84526	4.17490	-2.32513	0.83855	3.90727	-2.24907	0.74455	3.89193	-2.41916	0.78626	3.29187	-2.00065	0.50856	3.10607	-1.64117	0.36043
112		4.69167	-2.48257	1.02567	4.59519	-2.48663	0.99272	4.37431	-2.45921	0.92626	4.25097	-2.52955	0.91466	3.86517	-2.15188	0.70794	3.47166	-1.74831	0.48974
113		4.74716	-2.30530	0.99034	4.59627	-2.46486	0.99200	4.41150	-2.39443	0.90686	4.25097	-2.52955	0.91466	3.86517	-2.15188	0.70794	3.47166	-1.74831	0.48974
114		4.89443	-2.35176	1.04392	4.74099	-2.51341	1.04484	4.57811	-2.44459	0.96229	4.11114	-2.57881	0.87193	4.06339	-2.20429	0.77533	3.68342	-1.81036	0.56463
115		4.82498	0.44237	0.28978	4.65503	0.44811	0.22157	4.49179	0.44459	0.17770	4.30775	0.44954	0.12583	3.93952	0.44834	0.02505	3.52125	0.44891	-0.08894
116		4.82498	0.44237	0.28978	4.65503	0.44811	0.22157	4.49179	0.44459	0.17770	4.30775	0.44954	0.12583	3.93952	0.44834	0.02505	3.52125	0.44891	-0.08894
117	Start of scan line	4.82442	0.00000	0.38908	4.66490	0.00000	0.34258	4.50000	0.00000	0.30000	4.32801	0.00000	0.25305	3.96553	0.00000	0.15265	3.56887	0.00000	0.04390
118	Middle of rotation	4.82442	0.00000	0.38907	4.66490	0.00000	0.34258	4.50000	0.00000	0.30000	4.32801	0.00000	0.25305	3.96553	0.00000	0.15265	3.56887	0.00000	0.04390
119	End of scan line	4.94381	-1.51167	0.62398	4.80210	-1.65515	0.82387	4.60218	-1.53817	0.74880	4.47185	-1.71403	0.75509	4.08537	-1.40033	0.56428	3.67805	-1.08574	0.37020
120																			

equation, and the value of the function at the point (x, y) is given by the value of the function at the point (x, y) plus the value of the function at the point (x, y) times the value of the function at the point (x, y).

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	A	B	C	D	E	F	G	H	I	J
75		1			2			3		
76		Facet			Facet			Facet		
77	G1	8			10			12		
78	Point 1	5.95032	-0.72592	5.72516	5.75912	-0.72344	5.84633	5.57831	-0.71341	5.95933
79	Point 2	5.80752	-0.82205	5.83575	5.62511	-0.81564	5.95052	5.42747	-0.80763	6.07464
80	Point 3	5.79099	-0.77284	5.83618	5.62511	-0.81564	5.95052	5.42531	-0.80078	6.07461
81	Point 4	5.35054	-1.10363	6.18430	5.33722	-1.01369	6.17433	4.95130	-1.10154	6.43794
82	Point 5	5.44406	-4.23150	6.76631	5.37166	-4.30055	6.82654	4.94319	-4.40584	7.12079
83	Point 6	5.82668	-4.38204	6.55370	5.60403	-4.39100	6.69722	5.33088	-4.56037	6.90578
84	Point 7	5.83655	-4.33627	6.53803	5.60403	-4.39100	6.69722	5.33250	-4.55423	6.90349
85	Point 8	5.95867	-4.37550	6.46837	5.71110	-4.43267	6.63764	5.45432	-4.60159	6.83568
86	Point 9	5.95032	-0.72592	5.72516	5.75912	-0.72344	5.84633	5.57831	-0.71341	5.95933
87	Start of scan line	5.99623	-1.21758	5.79678	5.80609	-1.19815	5.91380	5.61623	-1.19501	6.03397
88	Middle of rotation	6.00363	-1.72998	5.89717	5.80862	-1.62630	6.00000	5.61481	-1.52325	6.10220
89	End of scan line	5.95828	-3.76722	6.34386	5.72650	-3.84809	6.50794	5.48105	-3.93033	6.68100
90										

FIG. 15A1

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[illegible]

FIG. 15A2

100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
100	Facet	1			Facet	2		Facet	3		Facet	4		Facet	5		Facet	6	
101	Point 1	7.38403	0.36621	3.60327	7.31635	0.35437	3.81936	7.25212	0.36293	4.03445	7.17687	0.33054	4.26573	7.03508	0.35981	4.74102	6.87159	0.34512	5.26544
102	Point 2	7.39689	0.30677	3.72290	7.27016	0.29548	3.93289	7.20014	0.30320	4.16642	7.13030	0.28192	4.39726	6.97694	0.30016	4.86659	6.81701	0.28708	5.40686
103	Point 3	7.35085	0.45214	3.75948	7.27048	0.29630	3.93374	7.20960	0.30685	4.19784	7.13030	0.28192	4.39726	6.97694	0.30354	4.86704	6.81701	0.28708	5.40686
104	Point 4	7.19569	0.19039	4.05695	7.13404	0.12287	4.28827	7.04932	0.16475	4.57132	7.02005	0.15884	4.66313	6.81288	0.12498	5.31804	6.72143	0.16544	5.85479
105	Point 5	6.76168	-2.71194	3.65330	6.69299	-2.84072	3.83654	6.61109	-2.72069	4.17539	6.55131	-2.93734	4.23771	6.36745	-2.80040	4.92441	6.22148	-3.06048	5.23666
106	Point 6	6.82335	-2.91744	3.62119	6.75959	-2.95787	3.81128	6.61699	-2.80659	3.96692	6.47684	-3.02659	3.96692	6.47684	-2.92071	4.49196	6.29421	-3.12902	4.98658
107	Point 7	6.86196	-2.76529	3.33225	6.77043	-2.89463	3.51128	6.71818	-2.79811	3.78090	6.61699	-3.02659	3.96692	6.47684	-2.92071	4.49196	6.29421	-3.12902	4.98658
108	Point 8	6.89054	-2.80469	3.21407	6.79682	-2.94536	3.40022	6.75933	-2.83903	3.64875	6.64613	-3.06618	3.84679	6.51493	-2.95743	4.49112	6.32024	-3.16838	4.84610
109	Point 9	7.39483	0.36621	3.60327	7.31635	0.35437	3.81936	7.25212	0.36293	4.03445	7.17687	0.33054	4.26573	7.03508	0.35981	4.74102	6.87159	0.34512	5.26544
110	Start of scan line	7.32381	0.00381	3.57345	7.25890	0.00056	3.78342	7.19246	0.00004	4.00001	7.12389	-0.00002	4.22381	6.97902	0.00007	4.69680	6.82143	0.00000	5.21120
111	Middle of rotation	7.32325	0.00000	3.57301	7.25882	0.00000	3.78336	7.19245	0.00000	4.00000	7.12389	0.00000	4.22382	6.97901	0.00000	4.69679	6.82143	0.00000	5.21120
112	End of scan line	7.01771	-2.11473	3.23472	6.92439	-2.31840	3.41071	6.87855	-2.14504	3.69387	6.77390	-2.39466	3.85384	6.84346	-2.26763	4.35980	6.44831	-2.50435	4.84743
120																			

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FIG. 15A3

	A	B	C	D	E	F	G	H	I	J
75		1			2			3		
76		Facet			Facet			Facet		
77	G1	8			10			12		
78	Point 1	4.09124	-2.79379	3.18258	3.69818	-2.92223	3.24153	3.24420	-3.02504	3.23954
79	Point 2	4.01214	-2.84817	3.23834	3.63983	-2.96298	3.28365	3.16721	-3.07489	3.28909
80	Point 3	3.98793	-2.83938	3.21628	3.63983	-2.96298	3.28365	3.16395	-3.07385	3.28633
81	Point 4	3.75453	-3.01427	3.40306	3.51489	-3.05022	3.37382	2.92561	-3.22999	3.44252
82	Point 5	5.22942	-4.63324	6.41511	5.13129	-4.70247	6.48702	4.61719	-4.94977	6.68618
83	Point 6	5.73352	-4.52709	6.42964	5.43660	-4.63666	6.49349	5.13524	-4.83496	6.69231
84	Point 7	5.72839	-4.50585	6.39515	5.43660	-4.63666	6.49349	5.13464	-4.83220	6.68785
85	Point 8	5.89808	-4.46565	6.39317	5.58735	-4.60417	6.49668	5.31142	-4.79243	6.68904
86	Point 9	4.09124	-2.79379	3.18258	3.69818	-2.92223	3.24153	3.24420	-3.02504	3.23954
87	Start of scan line	4.26503	-2.91167	3.42532	3.84166	-3.00957	3.42658	3.41287	-3.12422	3.45169
88	Middle of rotation	4.65630	-3.25182	4.08689	4.20000	-3.30000	4.00000	3.71220	-3.35150	3.90711
89	End of scan line	5.66800	-4.26040	5.99609	5.37598	-4.41413	6.12962	5.05851	-4.57920	6.27163
90										

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FIG. 15B1

FIG. 15B3

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	Facet			Facet			Facet			Facet			Facet			Facet		
106				2			3			4			5			6		
107/53																		
Point 1	7.39493	0.36621	3.60327	7.31635	0.35437	3.81936	7.28212	0.36293	4.03445	7.17887	0.36054	4.28573	7.03508	0.35581	4.74102	6.87159	0.34512	5.26544
Point 2	7.39689	0.36077	3.72290	7.27016	0.29548	3.93239	7.20680	0.30320	4.16542	7.13030	0.29192	4.38726	6.97894	0.30016	4.88759	6.81701	0.28708	5.40695
Point 3	7.35085	0.45214	3.78848	7.27046	0.29830	3.93374	7.20680	0.30685	4.19794	7.13030	0.29192	4.38726	6.97982	0.30364	4.88759	6.81701	0.28708	5.40695
Point 4	7.37595	0.41132	4.02887	7.13904	0.12287	4.28827	7.04932	0.16475	4.57132	6.65031	0.15884	4.66313	6.81288	0.12498	5.31804	6.72148	0.18544	5.64749
Point 5	7.19969	0.19089	3.69330	6.69289	-2.94072	3.83694	6.61109	-2.72069	4.17839	6.55131	-2.93734	4.23771	6.38745	-2.90040	4.92441	6.22148	-3.06048	5.23666
Point 6	6.76168	-2.71194	3.93219	6.76969	-2.95787	3.51164	6.69286	-2.86597	4.39174	6.81689	-3.02659	3.96892	6.47564	-2.92071	4.49196	6.29421	-3.12902	4.98858
Point 7	6.82335	-2.91744	3.38219	6.77043	-2.95493	3.51128	6.71818	-2.78980	4.36475	6.81689	-3.02659	3.96892	6.47564	-2.92071	4.49196	6.29421	-3.12902	4.98858
Point 8	6.86196	-2.76529	3.32225	6.77043	-2.95493	3.51128	6.71818	-2.78980	4.36475	6.81689	-3.02659	3.96892	6.47564	-2.92071	4.49196	6.29421	-3.12902	4.98858
Point 9	6.89054	-2.69469	3.21407	6.79682	-2.99436	3.40022	6.75093	-2.83803	3.64875	6.81689	-3.02659	3.96892	6.47564	-2.92071	4.49196	6.29421	-3.12902	4.98858
Point 10	7.38483	0.36621	3.60327	7.31635	0.35437	3.81936	7.28212	0.36293	4.03445	7.17887	0.36054	4.28573	7.03508	0.35581	4.74102	6.87159	0.34512	5.26544
Point 11	7.32381	0.03061	3.57945	7.25880	0.00056	3.78342	7.19246	0.00004	4.00001	7.12389	-0.00002	4.23281	6.97902	0.00007	4.69680	6.82148	0.00008	5.21121
Start of scan line	7.32381	0.03061	3.57945	7.25880	0.00056	3.78342	7.19246	0.00004	4.00001	7.12389	-0.00002	4.23281	6.97902	0.00007	4.69680	6.82148	0.00008	5.21121
Middle of rotation	7.32325	0.00000	3.57301	7.25882	0.00000	3.78335	7.19245	0.00000	4.00000	7.12389	0.00000	4.23282	6.97901	0.00000	4.69679	6.82143	0.00000	5.21120
End of scan line	7.01771	-2.11473	3.23472	6.92439	-2.31640	3.41071	6.87655	-2.14504	3.66887	6.77390	-2.39464	3.85384	6.64346	-2.26763	4.35890	6.48701	-2.50435	4.84743

A	B	C	D	E	F	G	H	I	J
	1			2			3		
	Facet			Facet			Facet		
	8			10			12		
76 G1									
Point 1	4.09124	-2.79379	3.18258	3.69818	-2.92223	3.24153	3.24420	-3.02504	3.23954
Point 2	4.01214	-2.84817	3.23834	3.63983	-2.96298	3.28365	3.16721	-3.07489	3.28909
Point 3	3.98793	-2.83938	3.21628	3.63983	-2.96298	3.28365	3.16395	-3.07385	3.28633
Point 4	3.75453	-3.01427	3.40306	3.51489	-3.05022	3.37382	2.92561	-3.22999	3.44252
Point 5	5.22942	-4.63324	6.41511	5.13129	-4.70247	6.48702	4.61719	-4.94977	6.68618
Point 6	5.73352	-4.52709	6.42964	5.43660	-4.63666	6.49349	5.13524	-4.83496	6.69231
Point 7	5.72839	-4.50585	6.39515	5.43660	-4.63666	6.49349	5.13464	-4.83220	6.68785
Point 8	5.89808	-4.46565	6.39317	5.58735	-4.60417	6.49668	5.31142	-4.79243	6.68904
Point 9	4.09124	-2.79379	3.18258	3.69818	-2.92223	3.24153	3.24420	-3.02504	3.23954
Start of scan line	4.26503	-2.91167	3.42532	3.84166	-3.00957	3.42658	3.41287	-3.12422	3.45169
Middle of rotation	4.65630	-3.25182	4.08689	4.20000	-3.30000	4.00000	3.71220	-3.35150	3.90711
End of scan line	5.66800	-4.26040	5.99609	5.37598	-4.41413	6.12962	5.05851	-4.57920	6.27163

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FIG. 15C1

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FIG. 15C2

	A	B	C	D	E	F	G	H	I	J
91		Facet			Facet			Facet		
92	G2	7			9			11		
93	Point 1	5.89808	4.46565	6.39317	5.58735	4.60417	6.49668	5.31142	4.79243	6.68904
94	Point 2	5.72839	4.50585	6.39515	5.43660	4.63666	6.49349	5.13464	4.83220	6.68785
95	Point 3	5.73352	4.52709	6.42964	5.43660	4.63666	6.49349	5.13524	4.83496	6.69231
96	Point 4	5.22942	4.63324	6.41511	5.13129	4.70247	6.48702	4.61719	4.94977	6.68618
97	Point 5	3.75453	3.01427	3.40306	3.51489	3.05022	3.37382	2.92561	3.22999	3.44252
98	Point 6	3.98793	2.83938	3.21628	3.63983	2.96298	3.28365	3.16395	3.07385	3.28633
99	Point 7	4.01214	2.84817	3.23834	3.63983	2.96298	3.28365	3.16721	3.07489	3.28909
100	Point 8	4.09124	2.79379	3.18258	3.69818	2.92223	3.24153	3.24420	3.02504	3.23954
101	Point 9	5.89808	4.46565	6.39317	5.58735	4.60417	6.49668	5.31142	4.79243	6.68904
102	Start of scan line	5.66800	4.26040	5.99609	5.37598	4.41413	6.12962	5.05851	4.57920	6.27163
103	Middle of rotation	4.65630	3.25182	4.08689	4.20000	3.30000	4.00000	3.71220	3.35150	3.90711
104	End of scan line	4.26503	2.91167	3.42532	3.84166	3.00957	3.42658	3.41287	3.12422	3.45169

[illegible]

A		B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Facet		Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet	Facet
106		1			2			3				4		5			6		
107	03																		
108		7.39483	0.36821	3.60327	7.31635	0.35437	3.81936	7.25212	0.35293	4.03445	7.17887	0.33054	4.26573	7.03509	0.35981	4.74102	6.87159	0.34512	5.26544
109	Point 1	7.39689	0.36877	3.72290	7.27018	0.39548	3.93374	7.20014	0.30320	4.16842	7.13030	0.29192	4.38726	6.97684	0.30016	4.86659	6.81701	0.28708	5.40695
110	Point 2	7.35065	0.45214	3.76848	7.27046	0.29830	3.93374	7.20680	0.39685	4.19794	7.13030	0.29192	4.38728	6.97921	0.30354	4.88784	6.81701	0.28708	5.40695
111	Point 3	7.35065	0.45214	3.76848	7.27046	0.29830	3.93374	7.20680	0.39685	4.19794	7.13030	0.29192	4.38728	6.97921	0.30354	4.88784	6.81701	0.28708	5.40695
112	Point 4	7.35065	0.45214	3.76848	7.27046	0.29830	3.93374	7.20680	0.39685	4.19794	7.13030	0.29192	4.38728	6.97921	0.30354	4.88784	6.81701	0.28708	5.40695
113	Point 5	6.76166	-2.71194	3.69330	6.69289	-2.94772	3.63594	6.61109	6.28632	3.80174	6.17839	6.55131	6.23771	6.36745	-2.80040	9.42441	6.22148	-3.08048	5.23666
114	Point 6	6.82335	-2.91744	3.62119	6.76969	-2.95787	3.51194	6.38268	6.17818	6.78090	6.61699	-3.02659	3.96952	6.47758	-2.91719	4.49136	6.28421	-3.12902	4.98858
115	Point 7	6.66196	-2.76529	3.32225	6.77043	-2.85493	3.51128	6.70683	3.40022	6.78090	6.61699	-3.02659	3.96952	6.47758	-2.91719	4.49136	6.28421	-3.12902	4.98858
116	Point 8	6.80654	-2.80459	3.21407	6.79682	-2.99436	3.40022	6.70683	3.40022	6.78090	6.61699	-3.02659	3.96952	6.47758	-2.91719	4.49136	6.28421	-3.12902	4.98858
117	Point 9	7.29463	0.39621	3.60327	7.31635	0.35437	3.81936	7.25212	0.35293	4.03445	7.17887	0.33054	4.26573	7.03509	0.35981	4.74102	6.87159	0.34512	5.26544
118	Start of scan line	3.57345	0.00361	3.57345	7.25980	0.00566	3.81936	7.25212	0.35293	4.03445	7.17887	0.33054	4.26573	7.03509	0.35981	4.74102	6.87159	0.34512	5.26544
119	Middle of rotation	7.32325	0.00000	3.57301	7.25882	0.00000	3.81936	7.25212	0.35293	4.03445	7.17887	0.33054	4.26573	7.03509	0.35981	4.74102	6.87159	0.34512	5.26544
120	End of scan line	7.01771	-2.11473	3.22472	6.92439	-2.31840	3.41071	6.87895	-2.14504	3.69887	6.77390	-2.39464	3.65394	6.64346	-2.26763	4.35960	6.48381	-2.50435	4.84743

FIG. 15C3

FIG. 15D1

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	A	B	C	D	E	F	G	H	I	J
91		Facet			Facet			Facet		
92	G2	7			9			11		
93	Point 1	5.89808	4.46565	6.39317	5.58735	4.60417	6.49668	5.31142	4.79243	6.68904
94	Point 2	5.72839	4.50585	6.39515	5.43660	4.63666	6.49349	5.13464	4.83220	6.68795
95	Point 3	5.73352	4.52709	6.42964	5.43660	4.63666	6.49349	5.13524	4.83496	6.69231
96	Point 4	5.22942	4.63324	6.41511	5.13129	4.70247	6.48702	4.61719	4.94977	6.68618
97	Point 5	3.75453	3.01427	3.40306	3.51489	3.05022	3.37382	2.92561	3.22999	3.44252
98	Point 6	3.98793	2.83938	3.21628	3.63983	2.96298	3.28365	3.16395	3.07385	3.28633
99	Point 7	4.01214	2.84817	3.23834	3.63983	2.96298	3.28365	3.16721	3.07489	3.28909
100	Point 8	4.09124	2.79379	3.18258	3.69818	2.92223	3.24153	3.24420	3.02504	3.23954
101	Point 9	5.89808	4.46565	6.39317	5.58735	4.60417	6.49668	5.31142	4.79243	6.68904
102	Start of scan line	5.66800	4.26040	5.99609	5.37598	4.41413	6.12962	5.05851	4.57920	6.27163
103	Middle of rotation	4.65630	3.25182	4.08689	4.20000	3.30000	4.00000	3.71220	3.35150	3.90711
104	End of scan line	4.26503	2.91167	3.42532	3.84166	3.00957	3.42658	3.41287	3.12422	3.45169
105										

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FIG. 15D2

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FIG. 15D3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
106		Facet 1			Facet 2			Facet 3			Facet 4			Facet 5			Facet 6		
107 G3																			
108	Point 1	7.38483	0.36621	3.60327	7.31635	0.35437	3.61936	7.25212	0.36233	4.03445	7.17887	0.35054	4.26573	7.03508	0.35981	4.74102	6.87159	0.34512	5.26544
109	Point 2	7.33689	0.30677	3.72290	7.27018	0.29546	3.93289	7.20014	0.30320	4.16942	7.13330	0.29192	4.39726	6.97694	0.30016	4.89559	6.81701	0.28708	5.40695
110	Point 3	7.35085	0.45214	3.76948	7.27046	0.29830	3.93374	7.20880	0.39685	4.19794	7.13030	0.29192	4.38726	6.97921	0.30354	4.88784	6.81701	0.28708	5.40695
111	Point 4	7.19609	0.19089	4.09695	7.13404	0.12287	4.26827	7.04932	0.16475	4.57132	7.02005	0.15894	4.56313	6.81288	0.12498	5.31904	6.22143	0.18544	5.65479
112	Point 5	6.78168	-2.71194	3.69330	6.69289	-2.84072	3.83654	6.61109	-2.72069	4.17939	6.55131	-2.93734	4.23771	6.38745	-2.80040	4.32441	6.22148	-3.06548	5.23666
113	Point 6	6.82335	-2.81174	3.56219	6.70469	-2.95767	3.51184	6.65266	-2.89697	3.80174	6.61699	-3.02659	3.96692	6.47664	-2.90771	4.49196	6.26421	-3.12902	4.98658
114	Point 7	6.89198	-2.76539	3.39225	6.77043	-2.95483	3.51126	6.71816	-2.79811	3.78090	6.61699	-3.02659	3.96692	6.47664	-2.90771	4.49196	6.26421	-3.12902	4.98658
115	Point 8	6.89054	-2.80469	3.21407	6.70682	-2.96436	3.40022	6.75093	-2.83003	3.64875	6.64613	-3.06518	3.84679	6.51493	-2.95743	4.34377	6.32024	-3.16539	4.94512
116	Point 9	7.39483	0.36621	3.60327	7.31635	0.35437	3.61936	7.25212	0.36233	4.03445	7.17887	0.35054	4.26573	7.03508	0.35981	4.74102	6.87159	0.34512	5.26544
117	Start of scan line	7.32981	0.00000	3.57345	7.25962	0.00000	3.78335	7.19245	0.00000	4.00000	7.12389	0.00000	4.22381	6.97902	0.00000	4.69680	6.82144	0.00000	5.21121
118	Middle of rotation	7.32925	0.00000	3.57301	7.25862	0.00000	3.78335	7.19245	0.00000	4.00000	7.12389	0.00000	4.22381	6.97902	0.00000	4.69680	6.82144	0.00000	5.21121
119	End of scan line	7.01771	-2.11473	3.23472	6.92439	-2.31640	3.41071	6.87655	-2.14504	3.65937	6.77330	-2.39464	3.85384	6.64346	-2.26763	4.35990	6.44831	-2.50435	4.84743

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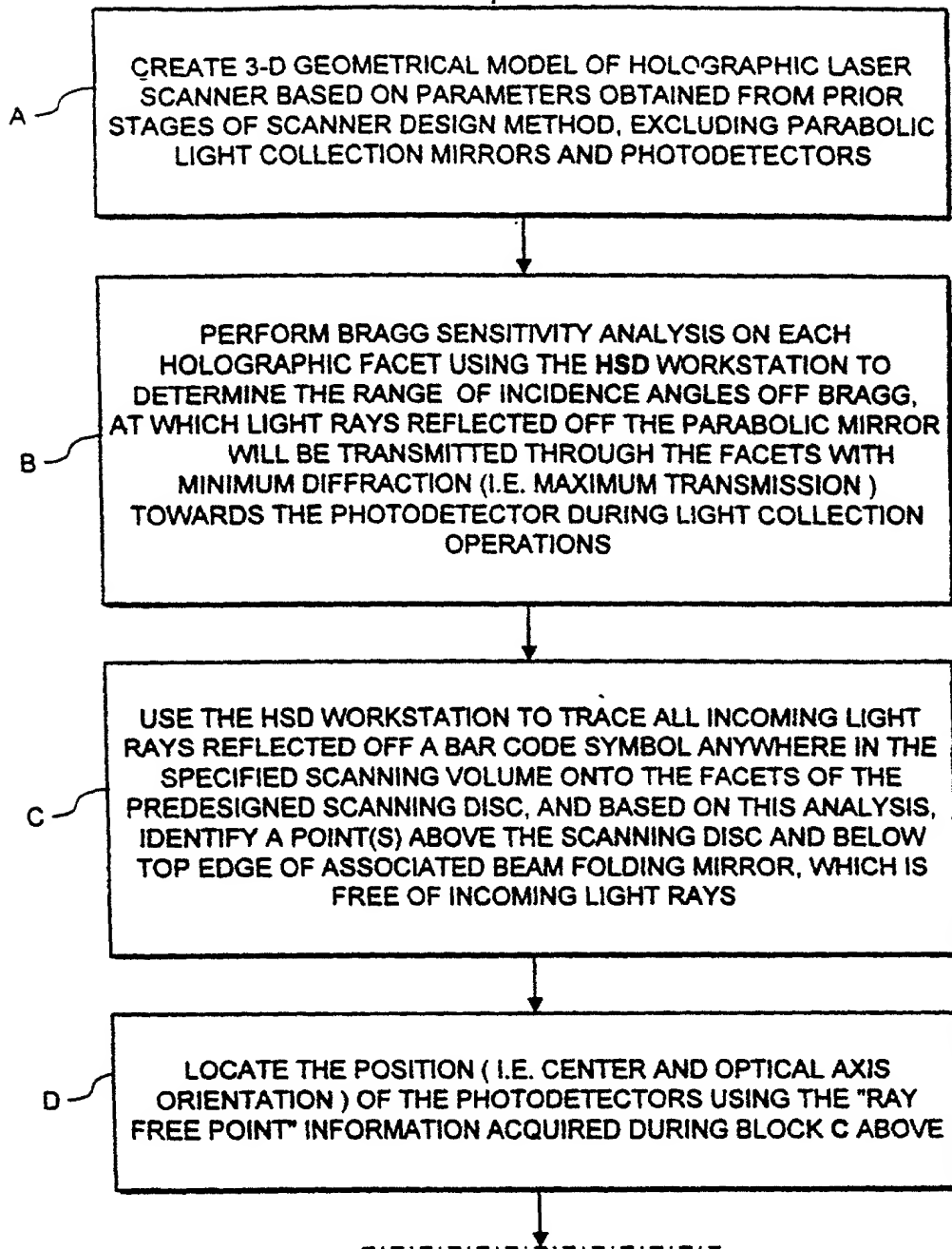


FIG. 16A

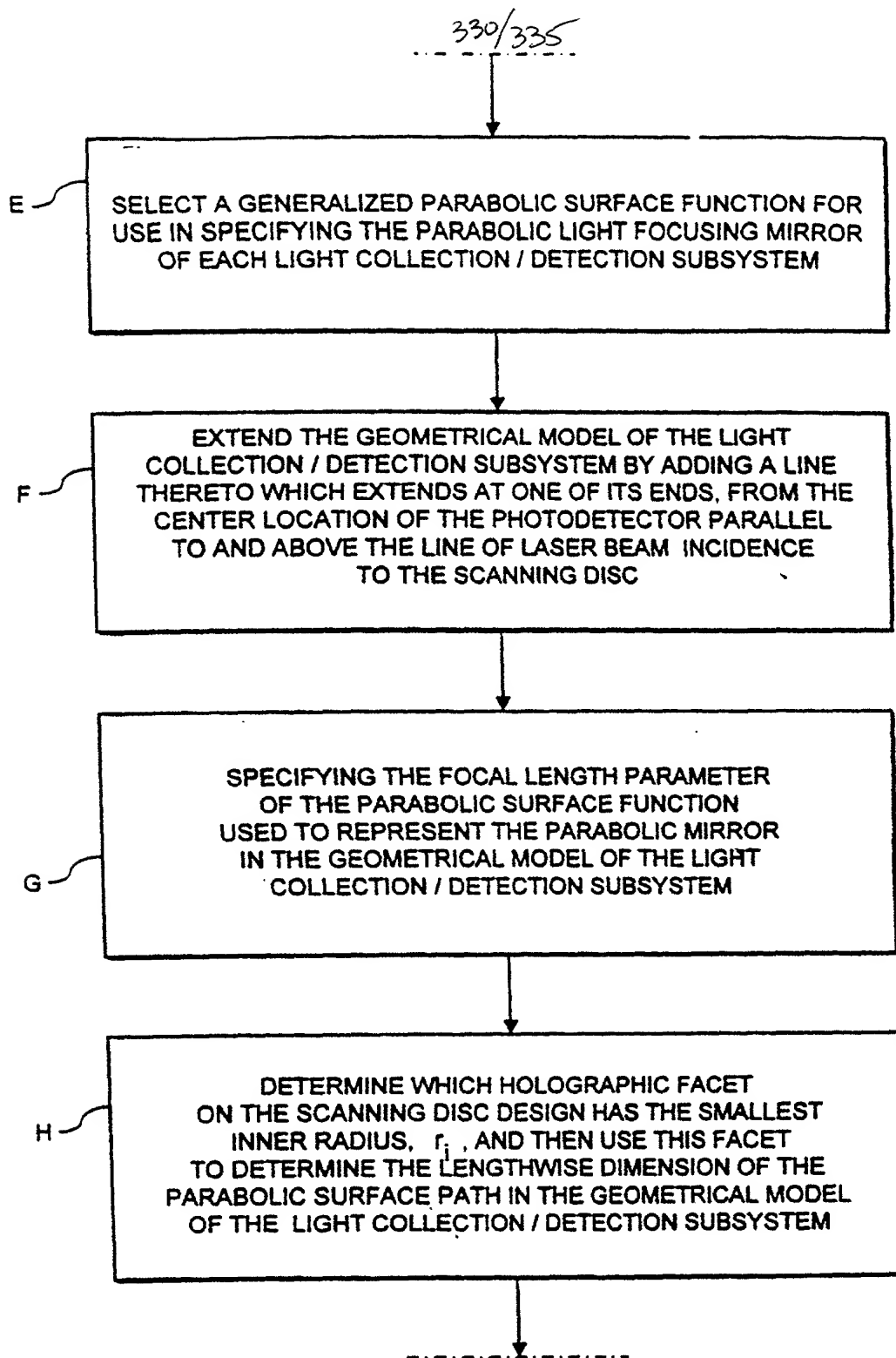


FIG. 16B

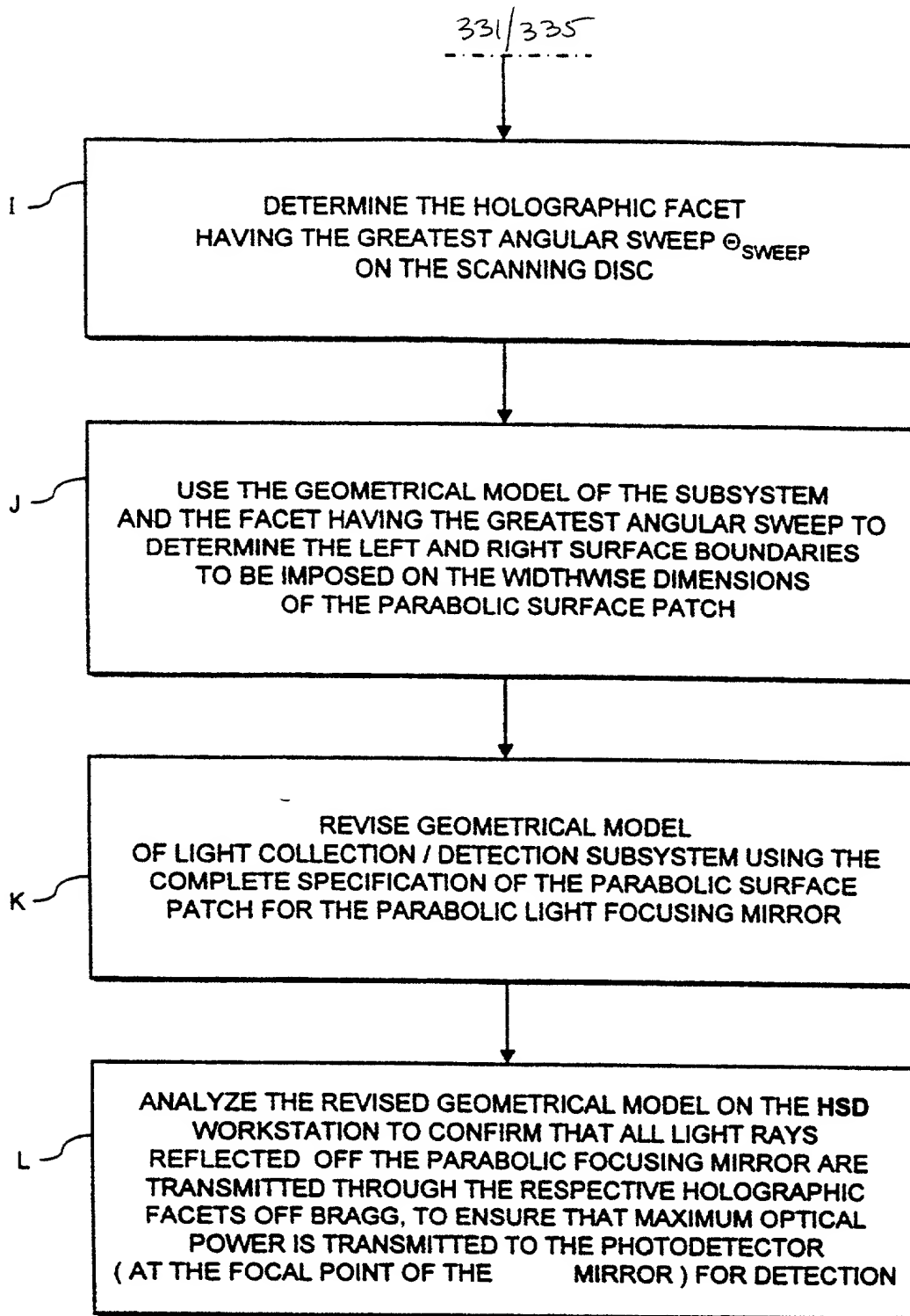


FIG. 16C

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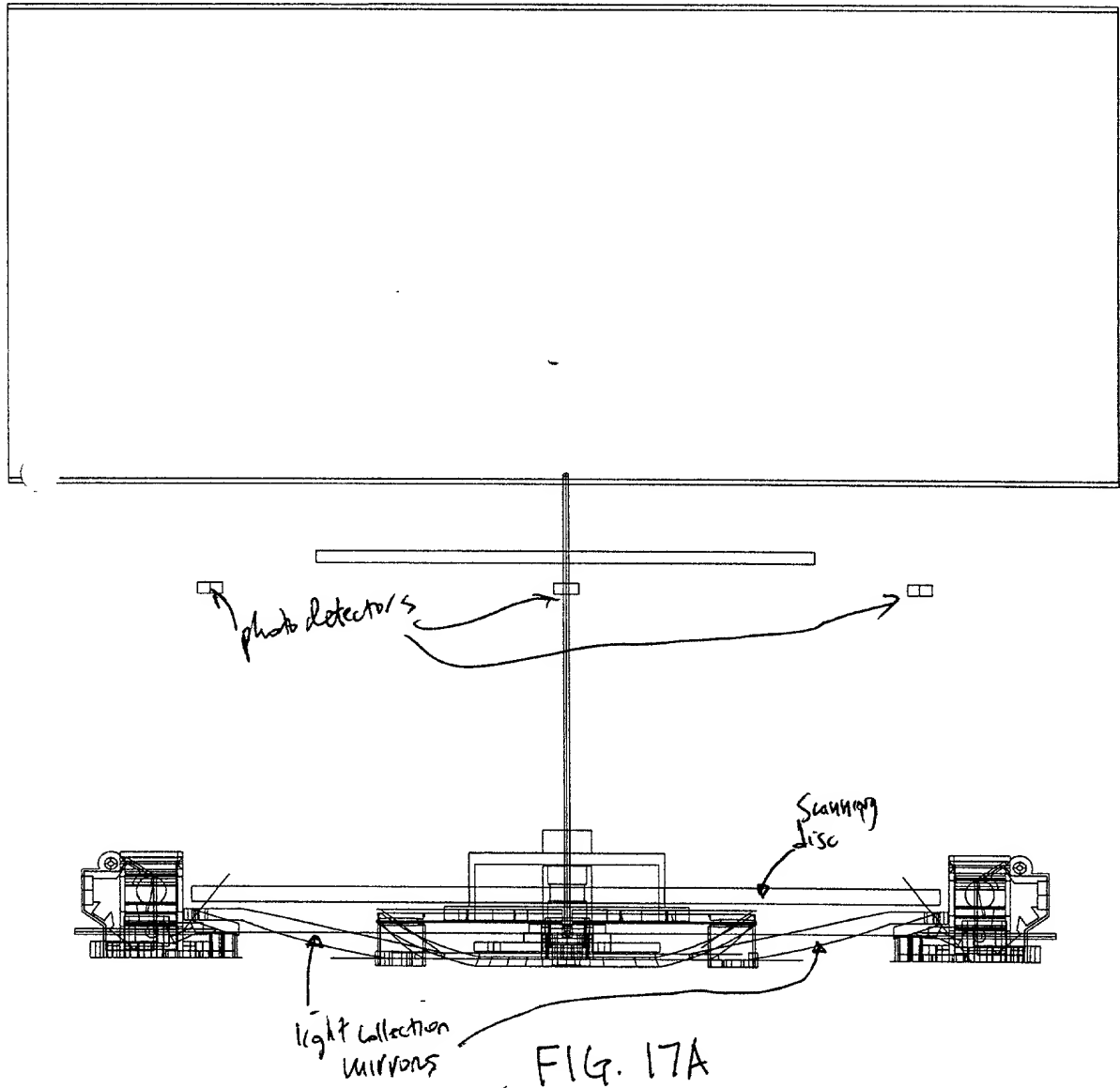


FIG. 17A

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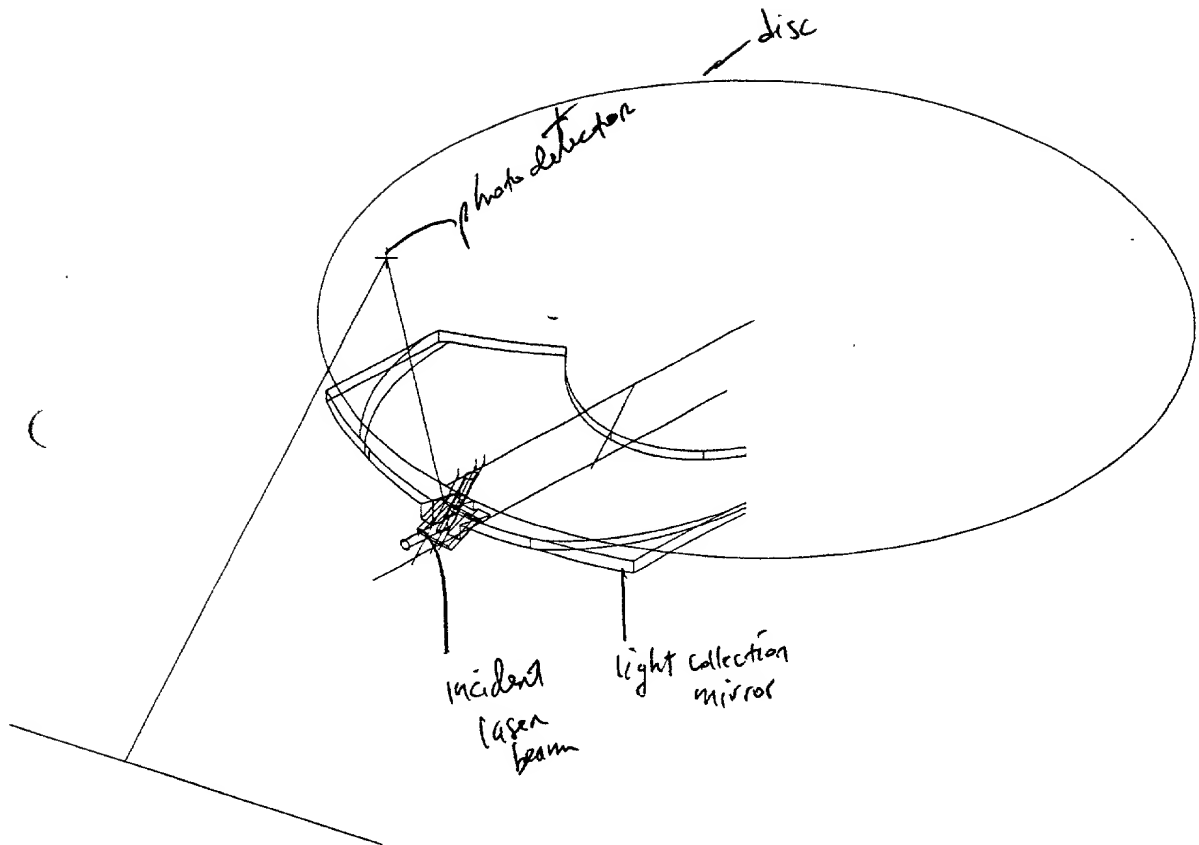


FIG. 17B

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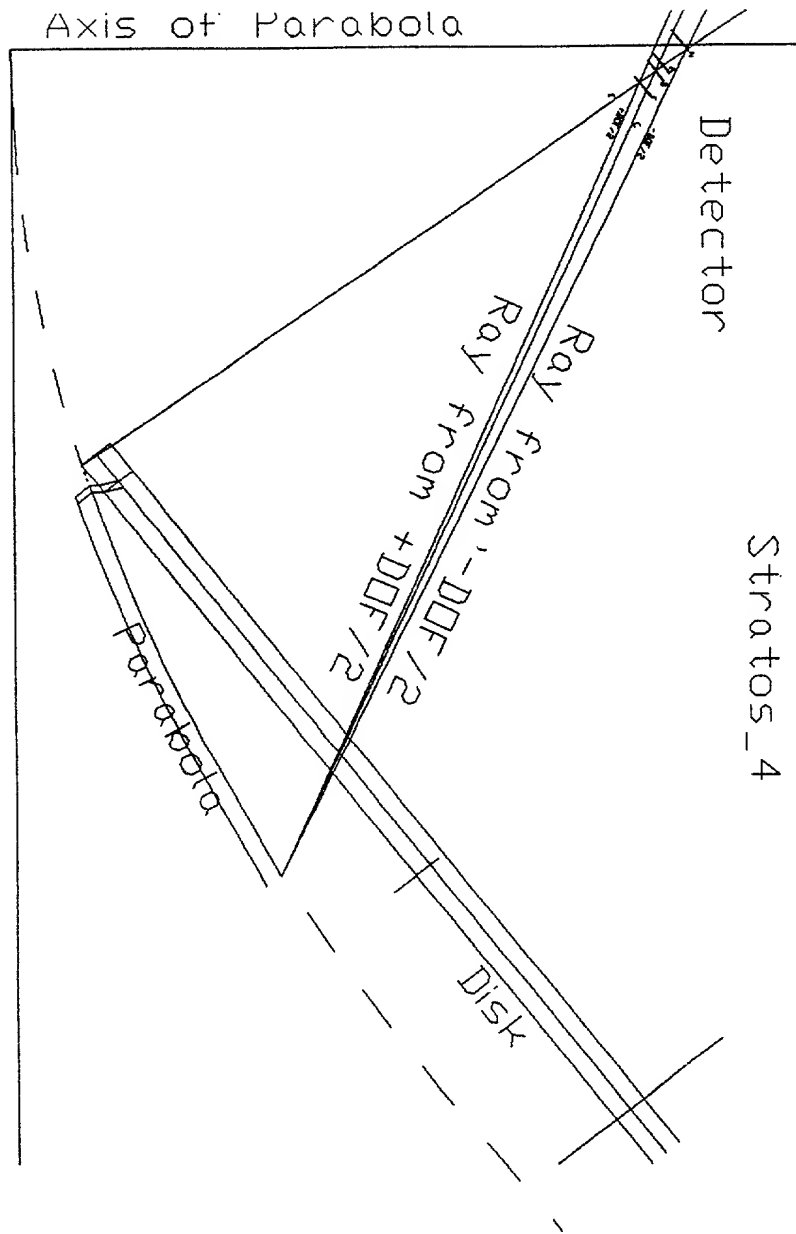


FIG. 17C

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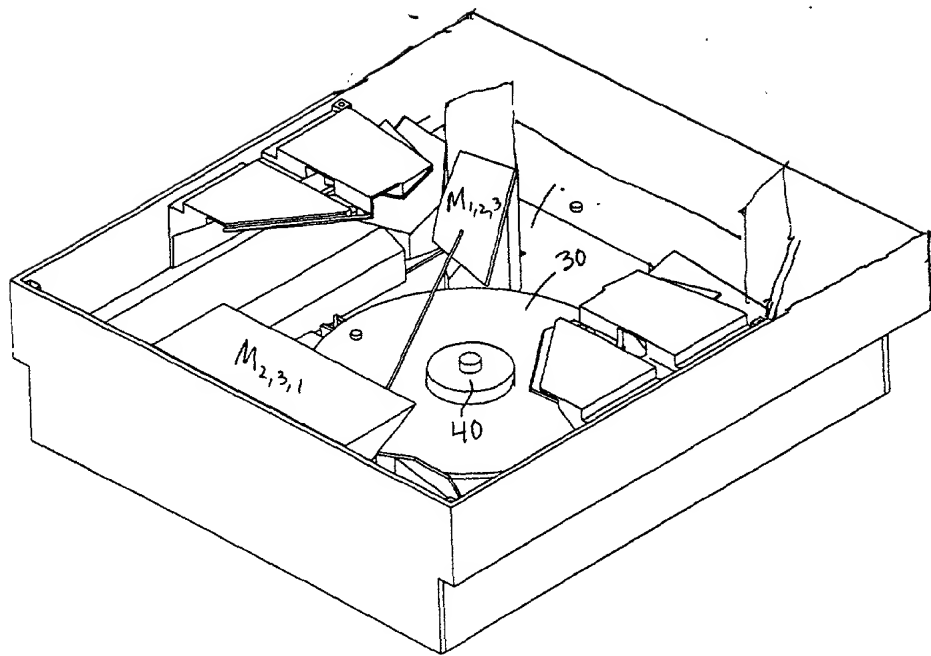


FIG. 18